JPRS-TND-86-015

23 JULY 1986

Worldwide Report

NUCLEAR DEVELOPMENT AND PROLIFERATION

FBIS FOREIGN BROADCAST INFORMATION SERVICE

NOTE

JPRS publications contain information primarily from foreign newspapers, periodicals and books, but also from news agency transmissions and broadcasts. Materials from foreign-language sources are translated; those from English-language sources are transcribed or reprinted, with the original phrasing and other characteristics retained.

Headlines, editorial reports, and material enclosed in brackets [] are supplied by JPRS. Processing indicators such as [Text] or [Excerpt] in the first line of each item, or following the last line of a brief, indicate how the original information was processed. Where no processing indicator is given, the information was summarized or extracted.

Unfamiliar names rendered phonetically or transliterated are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear in the original but have been supplied as appropriate in context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by source.

The contents of this publication in no way represent the policies, views or attitudes of the U.S. Government.

PROCUREMENT OF PUBLICATIONS

JPRS publications may be ordered from the National Technical Information Service, Springfield, Virginia 22161. In ordering, it is recommended that the JPRS number, title, date and author, if applicable, of publication be cited.

Current JPRS publications are announced in Government Reports Announcements issued semi-monthly by the National Technical Information Service, and are listed in the Monthly Catalog of U.S. Government Publications issued by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Correspondence pertaining to matters other than procurement may be addressed to Joint Publications Research Service, 1000 North Glebe Road, Arlington, Virginia 22201.

JPRS-TND-86-015

23 JULY 1986

WORLDWIDE REPORT

NUCLEAR DEVELOPMENT AND PROLIFERATION

CONTENTS

ASIA

CANADA

EAST EUROPE

BULGARIA

HUNGARY

WEST EUROPE

/6539

JAPAN

KOHL LAUDS SUMMIT STAND ON NUCLEAR SAFETY, TERRORISM

OW061106 Tokyo KYODO in English 1053 GMT 6 May 86

[Text] Tokyo, May 6 KYODO -- West German Chancellor Helmut Kohl told a press conference Tuesday he was pleased with the Tokyo summit statement on the Chernobyl nuclear accident, which was one of the most important issues for his country because of its proximity to the Soviet Union. But, he added, the West should not use the Soviet accident for anti-Soviet propaganda. Kohl said he hopes an international conference will be held to discuss improved safety for nuclear power plants.

On terrorism, Kohl said he was pleased with the summit statement issued Monday, but that West Germany does not support economic sanctions against Libya or other nations.

Referring to international exchange rates, West German Finance Minister Gerhard Stoltenberg said, "we can't exclude the possibility of intervention." The United States has realized at the summit that further decline in the value of the dollar vis-a-vis other currencies could spark negative economic trends such as inflation, he said, adding the general mood is that exchange rates should level off.

Foreign Minister Hans-Dietrich Genscher indicated that the Tokyo summit was different from previous summits because of the great interest in environmental questions and terrorism.

Speaking on third world problems, West German officials said the summiteers recognized that developing countries are more important to the world economy than they previously thought. The International Monetary Fund and the World Bank will have to try harder to stem the outflow of capital from developing countries, the officials noted, but the countries themselves must also adopt policies more conducive to development.

/9274
CSO: 5160/060

PEOPLE'S REPUBLIC OF CHINA

HONG KONG TO SEEK ADVICE FROM BRITAIN ON NUCLEAR PLANT SAFETY

HK270426 Hong Kong SOUTH CHINA MORNING POST in English 27 Jun 86 pp 1, 2

[Report by Terry Lee and Frank Choi]

[Text] Mounting opposition to the $27 billion Daya Bay nuclear power plant has led the government to seek high-level advice from British authorities.

Secretary for Economic Services John Yaxley leaves for England next month to receive information from Whitehall and the Department of Energy, as public opposition to the Guangdong nuclear plant grows.

Yesterday, an environmentalist said the plant, scheduled to be ready in 1991, would pose an environmental crisis for Hong Kong.

Although the government appears to have distanced itself from the Daya Bay debate, sources said Mr Yaxley's mission is a measure of official anxiety about the public's increasing opposition to the plant.

The government will continue to provide information to the public, sources said, but will leave China Light and Power Company and the Guangdong Nuclear Power Joint Venture Company (JVC) to bear the brunt of public animosity.

Financial Secretary Piers Jacobs said yesterday after a meeting with unofficial members of the Executive and Legislative Councils that the construction and future operation of the plant are the responsibility of the JVC.

He said the Hong Kong Government is in the position of any other metropolitan authority where a nuclear power station is built nearby.

Daya Bay, less than 70 kilometres from Hong Kong, will provide 70 percent of China Light and Power's output.

The Senior Unofficial Member of Legislative Council Miss Lydia Dunn described the present public concern as a "confidence crisis" on the safety of the plant.

The governor's top advisers from the two senior councils--Executive and Legislative Councils--will meet this afternoon in their in-house meeting to outline strategies for a possible adjournment debate on Daya Bay.

Three JVC experts will fly in this morning to brief Umelco [unofficial members of the executive and legislative councils] public utilities panel members on safety measures at the plant.

The meeting is expected to be a question-and-answer session, with JVC hoping to give assurances on the topics Hong Kong people have raised.

JVC experts will try to persuade members that the plant will have a low accident rate, and that the probability of a leakage outside the plant is extremely low.

The government has no direct role in the plant's construction and operation except for putting up a guarantee of a commercial loan by the Hong Kong Nuclear Investment Company (HHNIC) up to a maximum of $600 million.

Mr Jacobs said the government will ask all those involved in the building and operation of the plant to provide reassurances for people in Hong Kong.

Mr Jacobs said Mr Yaxley's London visit was a government effort to help Hong Kong people to learn more about the safety aspects of the plant.

Mr Yaxley will meet officials from the Department of Energy, the Central Electricity Generating Board, and the United Kingdom Nuclear Installation Corporation.

He is also planning to visit a nuclear plant and visit selected local authorities, including police and fire services to look at their contingency plans.

Mr Jacobs said discussions are also in progress with the UK Atomic Energy Authority at Harwell, who have been engaged by the government as consultants.

The government came under attack by environmentalists yesterday for excluding the Environmental Protection Advisory Committee (Epcom) from monitoring the Daya Bay nuclear plant.

Mr Twap Sek-lun, an outspoken Epcom member and the adviser to the Conservancy Association, criticized as "absurd" the government's decision to give the job to the Royal Observatory.

He alleged that the decision is a political one, and criticized the government for failing to shoulder its responsibility, and for lending too little weight to the plant's ecological impact.

Mr Wan said Epcom was the only suitable place to discuss the potential risk of the plant, and also the ideal organization to monitor the plant's ecological impact in the future.

"Obviously, the N-plant will pose the greatest-ever environmental crisis to Hong Kong in the years to come," he said.

He said the danger with radioactivity lies with its cumulative effect under low levels, but long-term exposure.

When the levels are high enough for the observatory to give a warning, it will already be too late, he said.

PEOPLE'S REPUBLIC OF CHINA

PAPER REPORTS ON PLANS FOR DAYA BAY POWER PLANT

Visit to Guangdong Company

Hong Kong SOUTH CHINA SUNDAY MORNING POST [SPECTRUM Supplement] in English
25 May 86 pp 1, 2

[Article by Kate Southam]

[Text]

"PEOPLE in Hongkong are concerned which, in my personal view, is easy to understand . . . it's only natural," says Mr Yu Fuxiang, safety engineer at the Guangdong Nuclear Power Joint Venture Company (JVC).

In the wake of the Chernobyl accident in the Soviet Union, letters raising questions about Daya Bay have appeared regularly in local newspapers and this month nine pressure groups met Umelco members to voice their concern.

It has not gone unnoticed. JVC appears anxious to answer questions on the $27 billion project — after all, when the station is finished, 70 per cent of the 1,800-megawatt output will be used by Hongkong. The two 900-megawatt pressurised water reactors will be commissioned in 1992 and 1993.

"This is the biggest joint venture project in China and one of the most important," Mr Yu said.

A reflection of that importance has been the stream of Beijing visitors from various ministries to the Daya Bay site. Vice-Premier Li Peng met engineers only last Tuesday. He told reporters in Shenzhen that the Chinese principles of building power stations were "safety first and quality first".

"In principle, we will be adopting French safety standards while referring to international standards for possible revisions," Mr Li said.

JVC's recruitment drive is another example. The cream of the nuclear and engineering industry has been drawn from all over China to work at Daya Bay.

Mr Zan Yunlong, JVC's general manager, is a nuclear physicist. Mr Shen Jiemxiong, chief engineer of the Ministry Of Nuclear Industry, is working closely with the company. The Ministry is the official Government department in charge of the project.

Letters of intent have been signed with the French company Framatome and the national utility Electricite de France as well as British firm GEC. As part of the agreement with the French companies, a number of JVC staff will train in France in both simulators and operating stations.

Mr Yu, a nuclear engineer, was sent to Paris in 1982 to study at the Institute of Nuclear Energy Research, and six other staff members from JVC are currently in France. It is Mr Yu's job to compile the safety analysis reports for the Nuclear Safety Bureau in Beijing. Each stage of the project has to be given the nod by the NSB before it can go ahead.

"The project is divided into four stages. The first was site selection, and the second, site development, is underway," Mr Yu explained.

A preliminary report on safety measures, including design specifications and quality control, will be submitted to the NSB in August next year.

"The bureau will take up to six months to study it so a construction permit will be issued sometime in 1988," Mr Yu said.

Building the power station is stage three. When it is complete, another permit will be issued by the NSB before the first reactor is loaded with fuel.

After a "loaded trial period", an operation licence will be issued "which will take one to two years to get". Mr Yu added that China is a member of the International Atomic Energy Agency and must abide by its regulations and guidelines. France is also a member and has to follow these guidelines when making nuclear sales to other countries.

Observers from the NSB will go to France while equipment is manufactured, and others will be sent to the Daya Bay site.

"In addition we have to submit reports to the Environmental Protection Bureau in Beijing," said Mr Yu. "Before construction can start, the area, population, vegetation and marine life on the nearby seashores have to be studied thoroughly to see what sort of impact the station will have after it is commissioned."

Mr Yu said China would be solely responsible for monitoring

safety conditions at the power station.

"The Royal Observatory in Hongkong may set up a monitoring system to measure radioactive material in the air but that will be separate from the safety authority which will be handled only by China," he said.

China's first nuclear power station is being built in Zhejiang Province without foreign help. The 300-megawatt Qinshan station will be commissioned in 1989. The second phase of the station will include two 600-megawatt reactors.

But Mr Yu described Daya Bay as the real pioneer of nuclear power in China. In line with its modernisation plans, China wants to build a string of power stations. Its scientists have been pushing hard for nuclear power development since 1980.

At an atomic energy seminar in Beijing in February that year, Mr Jiang Shengjie, a nuclear scientist, told the audience that nuclear energy was "an inalienable part of future energy sources in China".

Mr Jiang, also a vice minister of the Second Ministry Of Machine Building, added that China could build her own power stations without foreign help and urged that development should start. The Chinese Nuclear Society was founded at that meeting.

He repeated his plea that March before 1,500 delegates of the National Congress of the Chinese Scientific and Technical Association, calling for a national investigation into the potential of nuclear power. China has 600 billion tons of coal reserves but only five per cent of the country's production comes from the southern provinces of Guandong, Guangxi and Guizhou.

In October 1980, a team of scientists completed a four-month study which advocated the use of nuclear power in Guangdong and East China.

Nuclear power is also to play an important part in Mr Gorbachev's plans to double the size of the Soviet economy by the year 2000. The Soviet Union has about 51 reactors supplying 11 per cent of the nation's power.

There are an estimated 375 commercial nuclear power plants operating around the world. France is the leading nation, with 44 plants supplying 65 per cent of the country's energy.

Despite the comforting words that France is overseeing the Daya Bay project, the level of expertise that will eventually run the station is a source of concern for nervous Hongkong. The memory of the mishap at Three Mile Island in Pennsylvania in March 1979 has not faded.

In that accident, one of two reactors lost its coolant, causing radioactive fuel to overheat and leading to a partial meltdown. The accident was triggered by equipment malfunctions and compounded by staff who did not know how to react.

JVC will use a simulator at the Daya Bay site to throw staff into emergency situations.

"Even airline pilots get rusty and need to be thrown into a simulator to bone up," said engineer Mr Gary Ward, who is working at Daya Bay. "Apart from the simulator, staff are being sent to work in operating French stations."

"Likewise, French operators will be working at the plant in Daya Bay. It will be an integrated team."

The Daya Bay reactors will be housed in a thick concrete containment building with a steel liner to prevent any leak of radioactive material into the environment in the event of an accident. In the Three Mile Island accident, a similar casing prevented a major disaster by containing most of the escaping radioactive material.

The Chernobyl reactor unit had no protective structure and at the height of the blaze its white-hot graphite core burned at temperatures reaching almost 3,000 deg C. Western governments were quick to point out differences in the Chernobyl plant after the accident.

British Environment Secretary Mr Kenneth Baker told Parliament: "There is no other station like it in the world. British engineers have evaluated this design and rejected it as unstable."

White House spokesman Mr Larry Speakes said American plants "are quite different from the Soviet system and have a number of redundant safety systems built in".

Hongkong's Director of Electrical and Mechanical Services, Mr Graham Osborne, relayed the differences between the Soviet plant and the Daya Bay project after discussions with the French company Framatome.

He said the graphite installation at Chernobyl is considered outmoded by western standards, adding that graphite is a pure form of carbon which is unstable at high temperatures and poses a fire risk in the event of overheating.

In the Chernobyl reactor, graphite moderates the nuclear process that eventually generates electric power. Water is used as a coolant. The Chernobyl plant also used a system in which the steam produced in the reactor drove the turbines.

In a pressurised water reactor, the water acts as a moderator as well as coolant and no other material is required. A pipe feeding freshwater to the plant will be cooled by seawater but at no time will the two mix. Such a reactor uses steam-driven generators so the reactor coolant is isolated from the steam driving the turbines.

Site formation started on the 19-hectare expanse at Daya Bay in the middle of 1984 and was completed at the end of last year. When it is finished, the station will cover about 90 hectares and the two reactors will be 80 metres high and 90 metres apart.

Senior site engineer Mr S. J. Jiang said the protective casing around each reactor would be 95 cm thick. A "proven French technique" would be used to build the protective casing, he added. It would involve special pre-stressed concrete with reinforced galvanised steel bars which can be adjusted. The station will be similar in size to those in France.

The Daya Bay project received its official baptism in September 1979 when a joint feasibility study was completed by the American firm Nuclear Services Ltd. The study was jointly signed on December 11, 1980, by Shih Chanhuang, then general manager of the Guangdong Power Company and Lord Kadoorie, chairman of the China Light And Power Company.

It recommended that a joint company be set up "in association with Hongkong and other interests to develop, manage, operate and own the proposed nuclear power station". The plant would have two units of 900 megawatts each and the possibilities which met safety and technical requirements were Mirs Bay and Daya Bay.

A statement from China Light in 1980 said that, if the project started in 1981, the two units could be on commercial operation by 1988 and 1989 respectively and the joint venture could continue until 2009. The report was then submitted to the governments of Guangdong, China, Hongkong and Britain.

PRC Commentary Stresses Safety

Hong Kong SOUTH CHINA MORNING POST in English 27 May 86 p 17

[Text]

China has launched a defence of the Daya Bay nuclear project in the aftermath of the Chernobyl disaster, stressing the high priority being placed on safety at the plant.

But at the same time, a commentary on the project admitted that China lacked the experience to manage nuclear plants and urged that more effort be spared in this direction.

The commentary, issued by the Hongkong bureau of the China News Service, China's internal news agency, said nuclear power had proved to be an economical, more advanced and reliable means of generating electricity, which had been adopted by more and more countries throughout the world.

The commentary said: "Hongkong residents are rather concerned with the accident at the Soviet Chernobyl nuclear plant. They are not only worried about the effects of the nuclear dust, as Chernobyl is miles away from us.

"What is more pressing is that at Daya Bay, which is close to us, a nuclear plant will be built and Hongkong residents are naturally concerned with its safety aspects."

The article said engineers at the Daya Bay plant and nuclear experts had pointed out that the Shenzhen plant was a different and more reliable model than the Chernobyl plant, and was much more secure from a safety angle.

Since this type of nuclear plant was introduced more than 20 years ago, there had only been one accident – at America's Three Mile Island – the consequences of which had not been as serious as in the case of the Soviet incident.

Nobody could guarantee that a nuclear plant was 100 per cent fault-proof, the article said, no matter what type of construction was used.

The only means of reducing the potential danger of nuclear energy was to provide proper safety installations and ensure a good management system.

The commentary said the safety provisions at Daya Bay would be of the highest order, but it noted that China was lacking in management experts for such a plant.

Although there were other nuclear reactors in China, the country did not have an operational nuclear power station and had no experience of managing such facilities.

It urged the Chinese authorities to start training local experts and to learn from the experience of advanced countries on nuclear-plant management.

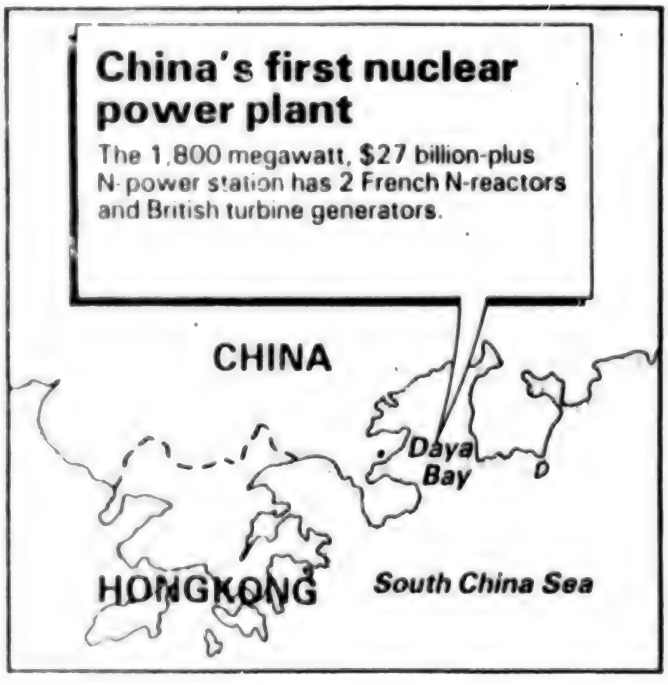
China should also encourage international technological and information exchanges, the article said.

Inside Daya Bay

Hong Kong SOUTH CHINA SUNDAY MORNING POST [SPECTRUM Supplement] in English 25 May 86 p 2

[Article by Kate Southam]

[Text]



THE reception the *Sunday Morning Post* received from the Guangdong Nuclear Joint Venture Co (JVC) was surprising.

During the trip to Shenzhen, Mr Robert Ip, public affairs manager of China Light And Power, warned that it was unlikely any JVC officials would talk to us. On the contrary, JVC engineers Mr Yu Fuxiang, Mr S.T. Jiang and Mr Gary Ward were happy to provide as much information as possible in the limited time available.

"The more people who come here the better," said Mr Ward.

But as a Chinese-based company, JVC cannot initiate an education programme for Hongkong people. Although China Light And Power will buy 70 per cent of the station's output, Mr Ip shrugged off the company's involvement in education, saying: "We are only the shareholders."

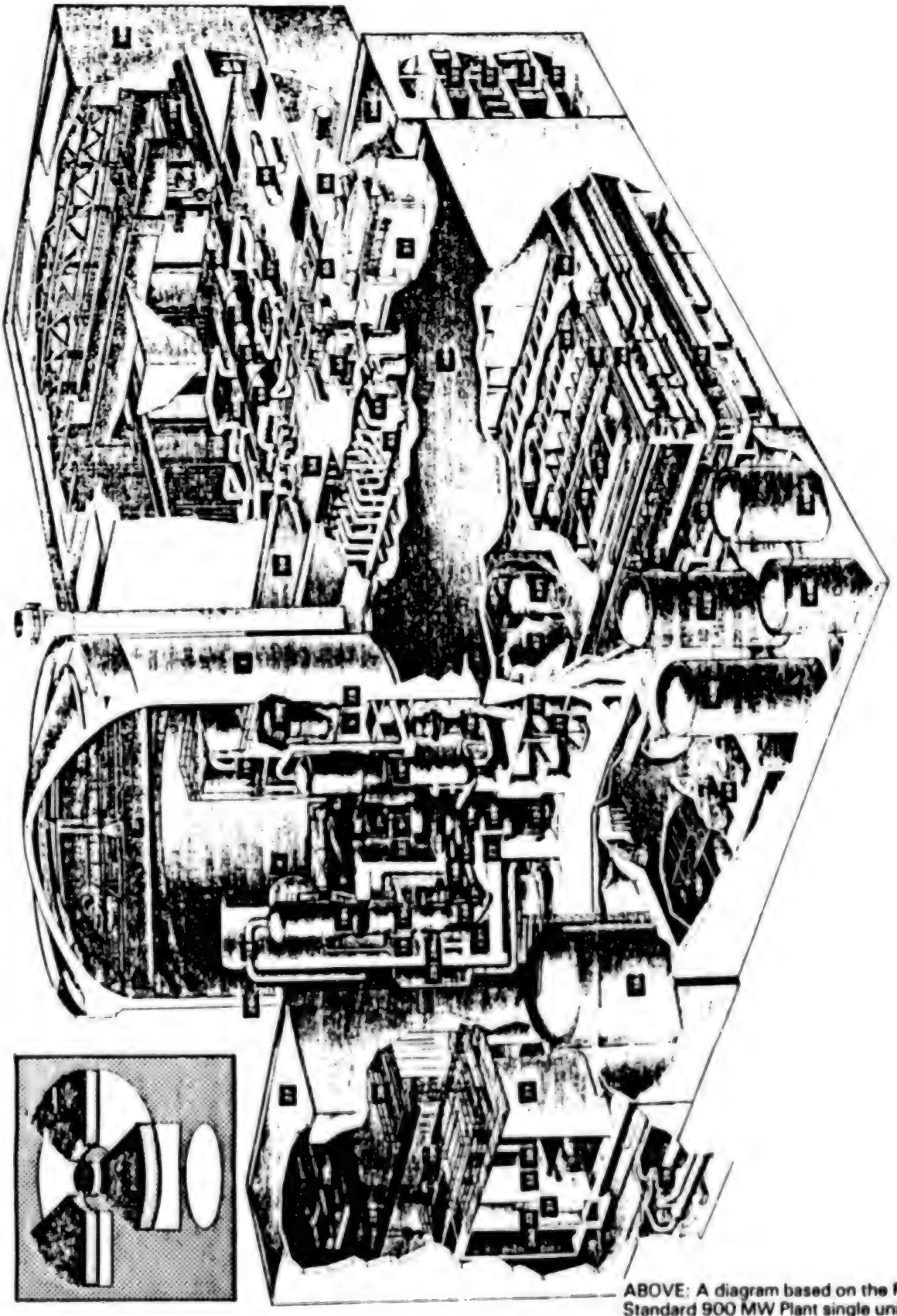
Which leaves the Government. In the wake of the Chernobyl disaster, the Government announced that it had commissioned an independent report last November to serve as the basis of a future education programme.

The study, by the UK Atomic Energy Authority based at Harwell in England, will assess the probabilities of different incidents or accidents at the nuclear power station and their consequences for Hongkong, and provide guidance on the design of a contingency plan.

The authority has also been advising the Royal Observatory on equipment specifications for its monitoring programme.

The report will not be completed until July next year but construction of the power plant will not begin until the year after and it will not become operational until 1992.

TOP: Senior site engineer S.T. Jiang and blasting expert Gary Ward, stand on top of a 38-metre high viewing platform overlooking the land on which the power station is to be built.



ABOVE: A diagram based on the French Standard 900 MW Plant single unit similar to that to be installed at Daya Bay.

HOW THE PLANT WILL WORK

1 REACTOR BUILDING

2 Polar crane; 3 Spray ramps; 4 Equipment hatch; 5 Operating floor; 6 Protection slab; 7 Control rod drive mechanisms (CRDMs); 8 CRDM support system; 9 CRDM ventilation shroud; 10 Reactor vessel; 11 Reactor vessel support ring; 12 In-core instrumentation guide tubes; 13 Reactor coolant pump; 14 Coolant loop; 15 Steam generato; 16 Horizontal support system; 17 Vertical support system; 18 Steam line; 19 Feedwater line; 20 Pressuriser; 21 Safety injection accumulator; 22 Reactor cavity; 23 Primary shield; 24 Secondary shield; 25 Containment annulus; 26 Containment wall.

27 FUEL BUILDING

28 Overhead crane; 29 Auxiliary bridge; 30 Spent fuel pit bridge; 31 Fuel transfer compartment; 32 Spent fuel pit; 33 Shipping cask loading compartment; 34 Shipping cask cleaning compartment; 35 Containment spray heat exchangers; 36 Refuelling water storage tank; 37 Spent fuel shipping cask; 38 Coffer dam; 39 New fuel storage cells.

40 NUCLEAR AUXILIARY BUILDING

41 Makeup water tanks; 42 Holdup tanks (boron recycle); 43 Piping gallery; 44 Valves operator gallery; 45 Evaporators; 46 Filter/demineraliser bay; 47 Surge tanks; 48 Component cooling heat exchangers; 49 Component cooling pumps.

50 ELECTRICAL BUILDING

51 Control room; 52 Analog control cabinets; 53 Relay circuitry; 54 LV and MV switchboards; 55 Cable deck.

56 TURBINE HALL

57 Overhead crane; 58 HP turbine cylinder; 59 LP turbine cylinder; 60 Generator; 61 Condenser; 62 Moisture separator-reheaters; 63 HP drain flash tank; 64 HP heaters; 65 LP heaters; 66 Steam transformer

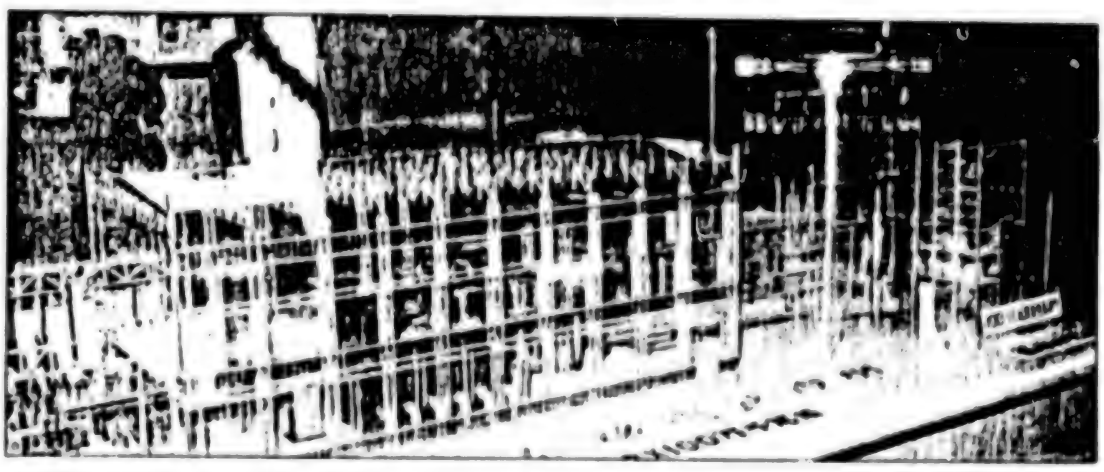
Daya Bay Described

Hong Kong SOUTH CHINA SUNDAY MORNING POST [SPECTRUM Supplement] in English 25 May 86 p 2

[Article by Kate Southam]

[Text]

A model of how the plant will look when completed



LIME green fields and a series of sandy beaches with foaming surf flash by during the 1½-hour drive from Shenzhen to Daya Bay.

Only a small section of the 65km road curling around the coastline is unsurfaced. At about the 45-minute mark, a modern white hotel appears on the right, nestled close to the beach in readiness for its opening next summer.

A grassy peninsula separates Mirs Bay from the Daya Bay site and a row of new pink brick residential blocks lines the road just before the site comes into view. As we approach from the right, the sprawling 197-hectare site looks like a series of flat muddy plains broken up by clumps of trees, paved stone walls, old Chinese buildings and the newer light brown portable offices.

A residential block is being built on the far top corner of the site and a freshwater reservoir stretches across the back, fed by two streams from the mountains beyond. A 50-hectare area is being prepared for the power station. It includes a large chunk of reclamation and lies at the front of the site backing onto the bay.

In a big room in the centre of the portable offices, Mr S.T. Jiang, senior site engineer, explains a series of maps that line a wall. Chinese tea cups and pots, left over from the day's visitors, are piled on a long table that runs down the centre of the room.

"We have had many visitors, officials from different ministries and vice-premiers," says Miss Mao Xiao, an on-site interpreter.

The curious include Lord Kadoorie, who visited last year. Miss Mao has been working at the site since last July following Mr Gary Ward, an Australian civil engineer, "everywhere".

"She follows me up mountainsides and through mud — sometimes up to her ankles," says Mr Ward with a laugh.

He was born in Victoria but has spent most of his career away from his home state, working on Australia's Snowy Mountain Scheme and countless projects in Asia. The blasting expert has been working in Daya Bay for three years and "will probably stay for seven more".

A tour of the site is organised aboard a four-wheel drive vehicle. It churns through the mud up to the viewing platform 38 metres above the bay, grinding past some of the damp workmen. The working day starts at 8 am, finishing at about 6 pm.

"There are about 1,000 workers here now and that figure will probably get up to 6,000, maybe more," says Mr Ward, exchanging waves. The car stops at the viewing platform for a photo session.

"I am trying to suss out a nice Chinese pagoda design for here but the idea is as far as we've gotten at the moment," says Mr Ward.

The power station site is directly below and two sets of four red and white pegs stand where the pair of 900-megawatt reactors will be built 90 metres apart from centre to centre. Huge 27-tonne blocks and mounds of rocks form a wall at the front of the site.

A special Japanese cement, which fights off marine erosion, was used to build the blocks and granite was quarried from behind the viewing platform where cement-crushing machinery now stands temporarily idle. Each block was put into place using an enormous crane from Singapore.

"It is the biggest crane ever to come to Hongkong," Mr Ward says, pointing at the blocks which look like they have been casually thrown by the waterside.

"We have spent a fortune sending all sorts of samples by air to France to be tested, including marine samples and pieces of granite," he says while directing the Land Cruiser past the machinery and down to the rock wall.

"We have many more blocks to make yet . . . we will be using thousands of them."

The 27-tonne blocks will make up four fifths of the protective wall while the rest will be shielded by 20-tonne blocks. Mr Ward estimates that about 800,000 tonnes of cement will be used in total. The wall running along the bay will protect the site from typhoon swells and bad weather.

"Last week there was a *tsunami* (Japanese for tidal wave) warning issued for Hongkong and we even took the possibility of that into account," he says.

Tsunamis are rare and the biggest recorded by the Royal Observatory measured a mere 33 cm above the normal tide.

Electronic surveys were carried out during the blasting work for the power station site to test its stability, and electronic equipment is being used in studies of air movements and weather conditions.

"People from the Royal Observatory visit here and our people visit them in Hongkong quite often. There is a good rapport between them and they exchange information," Mr Ward says.

On the peninsula side of the waterfront, a Chinese-built stone jetty runs out into the bay. A marble plaque engraved with the words "Guangdong Nuclear Power Station" is set into the stone. Building materials and equipment will all come by ship into the bay.

"A customs office will be set up over there," explains Mr Ward, waving towards the base of an adjacent hill.

The land cruiser ploughs on uphill towards the reservoir, sending hens scattering in all directions. Two small black puppies bound across the road at the sound of the horn and a woman villager glances up.

"There were two villages on the site and most of the people have already been resettled," says Mr Ward.

A tractor load of people pass on their way to a village on the other side of the quarry.

"It's a small village. I go over there sometimes for a meal."

The road winds up past the site entrance and further up, dozens of ceramic pots sit in neat rows.

"We had to move the village graves . . . we are just waiting for the villagers to select a good site and then we will move them and pay for the graves to be rebuilt."

A giant sloping concrete wall holds in the reservoir water, which is 31 metres deep in some parts, and French-style lamps line its top.

"The reservoir was a natural valley — it filled up in about three weeks when it was finished last year," Mr Ward explains.

The water gushes down from the left side and a water treatment plant is currently being built at the base of the slope "which will make the water cleaner than your blood" to supply the station and the residential blocks.

"There is no fishing or swimming allowed and anyone caught near the reservoir is practically shot," Mr Ward says half-joking. On the way back to the offices, he points out the areas where landscaping has begun.

"The long drawn-out negotiations have allowed us to do some work along the way."

A wide-angle view of the Bataan nuclear power project site

He points to a clump of long-established trees: "We have a big thing about saving trees at the moment. We are going to keep all the trees."

The bottom of the trees will be set in stone to provide a sitting-out area.

"There will also be recreational facilities. We want to create a nice working environment. I mean this is not going to be a slave labour camp," he says.

As we pass an old grey shack, Mr Ward explains lightly: "That's the snooker hall . . . we have a couple of tables in there."

A brief inspection of the engineers' office, the nerve centre, concludes the tour. Mr Ward and the Chinese engineers look more pleased than irritated by the press visit.

"The site is very open. In my opinion, the more people that come here the better . . . we are not trying to hide anything," he finishes in typical direct fashion.

Chernobyl Lessons

Hong Kong SOUTH CHINA SUNDAY MORNING POST [SPECTRUM Supplement] in English 25 May 86 p 2

[Article by Roy A. Medvedev, Soviet citizen and historian]

[Text]

AS the Soviet administration led by Mikhail Gorbachev begins its second year, the shadow of Chernobyl imposes great challenges upon the new leadership.

Before the incident at the atomic power station, Gorbachev's administration, sometimes called a "coalition of renovation" in the press or a "revolutionary turning point," "new course" or "strategy of acceleration," had indeed carried out some important reforms.

Its political base has been essentially strengthened and expanded after the 27th congress of the Communist Party of the Soviet Union. Special "brain centres" for formulating problems of security and external policy, ideological problems, economic and social problems have quickly been formed in the Kremlin.

But we have seen more changes in the Kremlin than outside it. Not long ago, I spent about a month in a little city in the northern Caucasus. The main change was the long lines for vodka, which is more difficult to buy now than meat or butter.

It would be wrong to underestimate the work done during the past year. But it would be an even bigger mistake to consider that the main difficulties, even aside from Chernobyl, are behind us.

At a recent meeting of newspaper editors in Moscow, Alexander Yakovlev of the party secretariat frankly admitted that the course of the 27th congress is encountering strong resistance in economic and party organisations as well as at the grass roots.

While talking with a group of theatre workers, Politburo member Yegor Ligachev recently declared: "We are not so afraid of the workers who openly resist the course of renovation, and such people exist. We are not so afraid of those who resist secretly, and such people also exist.

"But most dangerous are those who support all the new measures with their words and in practice leave everything unchanged."

The new leader of the Moscow party organisation recently admitted that even mass arrests among retail trade workers did not cut down abuses and plunder very much. "We didn't reach the bottom yet," Yeltsin declared.

Politburo member Lev Zaikov acknowledged there are not enough people in the party for assignment to the most responsible government positions.

This leads to the assignment of "temporary" leaders who must often be removed when they do not justify the confidence placed in them. In the regional committees of the party and in the central committee, a "reserve for promotion" — training of people who are intended to be promoted in a year or two — is being created.

Moreover, the course of active diplomacy undertaken by Gorbachev and his new style did not lead to any notable successes in foreign policy, especially in relations with the United States. President Reagan turned out to be a more difficult partner than it seemed last year at Geneva.

Yet the solutions for many problems must be found precisely with Reagan's administration.

Then came the unexpected accident at the Chernobyl atomic power station. On the political level, during the first days after the accident, one could detect an obvious uncertainty.

This was the reason for the almost instinctive reaction by the leadership, producing maximum limitation on almost all information about the reasons for and the consequences of the catastrophe.

Now we are no longer suffering from lack of information, but it still remains very one-sided. In the press the theme of heroism prevails over the theme of responsibility. The theme of courage is present but not the theme of negligence.

However, the topic is not about the eruption of a volcano or an earthquake, but about the consequences of the poor work of certain people and organisations.

Why, then, did our press put forward the general questions of international security and not raise the concrete problems of strengthening all the safety systems on the numerous Soviet atomic stations?

There is no doubt about the courage and self-sacrifice of the

firemen, who, perhaps at the price of their lives, prevented the spread of the fire in the fourth reactor over the entire station and thus blocked the destruction of controls for the whole plant.

But why were several super-powerful reactors placed on one floor and under one roof? Why were the cable channels for the entire station and the roof of the station made of such flammable materials?

What could have happened had chief firefighter Maj. Telyatnikov been less prompt and less skilful and the roof had collapsed on the firemen?

In that case, we would have had to deal with an accident involving not one but four reactors which contained more radioactive substances than several large atomic bombs.

There is no doubt about the courage of the builders and the soldiers who worked for 16 days under the burning reactor to bolster its foundation. Yet a question arises: Why during the construction of the plant, wasn't a foundation laid that was strong enough to withstand any possible accident?

Many such questions can be asked. There is also no doubt about the courage of the helicopter crews who dropped thousands of tons of sand, clay, lead and boron onto the burning reactor.

But wouldn't it be more rational to erect reinforced concrete containment domes over the reactors of atomic power stations as they do in the United States?

Long ago we were assured that Soviet atomic stations were totally secure and that the danger from them was being exaggerated in the West because of commercial competition.

As the academician N. Dollezhale wrote in a 1979 communist magazine article, we don't have private business and that's why the Soviet atomic stations "are the most reliable . . . of all the industrial enterprises, because the Soviet scientists have no other interests, but the interests of people, and the technical

[illegible] always [illegible] especially [illegible] goals."

Another academician, E. Sheindlin, declared in *Literaturnaya Gazeta* only two years ago: "Atomic power stations in our country are absolutely safe for the population so reasons for anxiety simply do not exist."

One can cite many such statements.

It is well known that plans for building nuclear plants in Western countries were cut back sharply in the end of the 1970s, especially after some accidents.

But in those same years the Soviet Union adopted a grandiose programme for construction of powerful and super-powerful atomic power stations, especially in the area west of the Volga River.

By 1985 there were 25 atomic stations, providing almost 10 per cent of all electric power production, in operation or under construction. In the next five years there are plans to add up to 20 atomic stations with 80 large reactors.

Our builders neglect the experience of other countries, which testify that small atomic stations are far more reliable than larger plants.

In the last 20 years there have been defects or small accidents at Soviet atomic stations, although many of the defects were carefully hidden, even by the administration of the atomic stations.

In 1983, when Yuri Andropov started his discipline campaign, a letter from the party central committee to local organisations said only sheer luck prevented criminal negligence by workers at an atomic station from turning into a "serious catastrophe."

That same year a special government committee for supervision of safety at atomic plants was established. Three weeks before the current catastrophe, one of the Ukrainian newspapers wrote about the low quality of work in construction of the Chernobyl reactors.

People less prejudiced but no less competent told me that under the current orders for constructing atomic stations a major accident would have occurred sooner or later and it could have been much bigger than the one at Chernobyl.

What lessons must be learned from the catastrophe? There is no doubt that the programme for new atomic stations in our country will be continued. But it is necessary:

- To reconsider where super-powerful reactors will be placed to keep them away from densely populated areas and to bring them closer to places where radioactive wastes are buried.
- To raise safety levels on existing atomic stations, to strengthen their foundations and to replace flammable materials in nuclear plants, including the roofs, and even to put reinforced concrete domes on them.
- To change the system of management and to isolate big reactors from one another. The country ought to refrain in the future from constructing reactors with very large capacities where very large quantities of radioactive materials are concentrated. In the Soviet Union, reactors of 1.5 million kilowatts are already in service, and reactors of 2.4 million kilowatts are projected.

Specialists can add considerably to these suggestions. Undoubtedly, the accomplishment of such safety measures will require considerable investment and, accordingly, the reduction of plans for development of atomic stations in the current five-year plan and in the period ending in the year 2000.

But who can calculate how much the catastrophe in Chernobyl has already cost our country? We are talking here not only about direct financial expenditures, but also about political, moral and other expenses, not even mentioning the loss of human life, which nothing can replace.

The new leadership of the Communist Party of the Soviet Union showed itself able to take hard decisions. One can hope that it will manage to draw the right conclusions from the lessons of Chernobyl.

/9274
CSO: 5150/0121

PEOPLE'S REPUBLIC OF CHINA

DAYA BAY SAFETY MEASURES UNDER REVIEW

HK150310 Hong Kong SUNDAY STANDARD in English 15 Jun 86 p 2

[Report by Chalina Chung]

[Text] China will review safety measures at the Daya Bay nuclear plant in the aftermath of the Soviet Chernobyl disaster which sent alarm signals throughout the world on the potential danger of nuclear plants.

Senior Unofficial Member of the Executive Council, Sir Sze-yuan Chung, disclosed this at a press conference yesterday soon after his return from London earlier in the day.

He said that the general secretary of the Chinese Communist Party, Mr Hu Yaobang, had told him that China would go ahead with the project, but would review the safety measures.

Sir Sze-yuan said he raised this controversial issue with Mr Hu at a reception accorded by British Prime Minister Margaret Thatcher to the Chinese leader during Mr Hu's recent visit to London.

Sir Sze-yuan said that Hong Kong people should not worry about the safety of the Daya Bay nuclear plant as it would include a contingency system designed for accidents such as explosions of the radioactive core.

"The design is not to prevent an accident, as many people will question how accidents can be avoided," Sir Sze-yuan pointed out.

But rather, the construction plan will have a built-in safety system to ensure that radiation does not leak out from the core even if accidents happen, he explained.

Sir Sze-yuan said he understood that a protective shell would be built around the radioactive core, so that in the event of any accident there would be no radiation leaks or meltdown.

/8309
CSO: 4010/58

PEOPLE'S REPUBLIC OF CHINA

HONG KONG EXPERTS RAISE QUESTIONS ON DAYA BAY PLANT

HK260227 Hong Kong SOUTH CHINA MORNING POST in English 26 Jun 86 p 22

[Report by Chris Yeung and Lulu Yu]

[Text] China has been urged to take a fresh look at the cost-effectiveness of the Daya Bay nuclear plant and to consider building it somewhere more remote from Hong Kong.

The appeal came from a 23-member local delegation of science and technology experts visiting Beijing this week.

The team also asked Beijing officials for more information about the plant, particularly its structural safety precautions and plans for its maintenance and repairs.

"We can only make an objective comment on the project after detailed information is available," said a delegate, Professor Poon Chung-kwong.

Professor Poon, a Legislative Council Unofficial and dean of the science faculty at Hong Kong University, was among five of the delegates who returned to Hong Kong yesterday.

The delegation is in Beijing to attend the third national conference of the China Association for Science and Technology that began on Monday and will end tomorrow.

Professor Poon said the Hong Kong team raised questions about the nuclear plant during a meeting with top Chinese nuclear officials including Mr Jiang Shengjie, the director-general of the Nuclear Safety Administration.

In the area of cost efficiency, delegates questioned why China is developing nuclear power as part of its future energy programme, in the face of declining fuel prices.

Professor Poon said Chinese officials are well aware of the anxiety of local people about the project.

The Hong Kong experts were assured that the nuclear plant will be equipped according to international safety standards, he said.

Several delegates asked the Beijing officials why Daya Bay was chosen as the site for the plant and urged China to move it further away, he added.

"They have not given a definite answer...there may be some practical difficulties in publicising all the details of the project," he said.

/12766
CSO: 5100/8

CANADA

CONFERENCE HELD ON RISK OF ACCIDENTAL NUCLEAR WAR

Vancouver THE SUN in English 27 May 86 p A2

[Article by Sarah Cox]

[Text] Accidental nuclear war is becoming inevitable as computers take over decisions traditionally made by humans, a conference examining the risk of accidental nuclear war was told Monday.

Fred Knelman, former director of the science and technology program at Concordia University in Quebec, said in the conference's keynote address that the new generation of weapons will decrease attack warning time to such an extent that computers will soon be solely responsible for deciding to launch a counter-attack.

But like the space shuttle Challenger, computer technology is far from infallible and early warning systems frequently sound false alarms, said Knelman.

Knelman, author of Reagan, God and the Bomb, said he is troubled by a rapidly growing fundamentalist Christian movement in the U.S. whose adherents, including Defence Secretary Caspar Weinberger, believe that Armageddon is inevitable.

/9274
CSO: 5120/43

CANADA

NAVY PROPOSES NUCLEAR SUBMARINES FOR ARCTIC BY 1995

Toronto THE GLOBE AND MAIL in English 2 Jun 86 pp B1, B3

[Article by Carey French]

[Text]

Canadian nuclear-powered hunter-killer submarines could be patrolling under the Arctic ice by 1995, according to proposals being developed for replacement of the navy's aging diesel-electric fleet.

When plans go before the federal Cabinet in a few weeks, the navy will propose the acquisition of up to 12 submarines — with a potential price tag of as much as $240-million each — starting with a firm order for four. Potential suppliers would be asked for prices on an additional two-, four- and eight-boat options.

A limited ice capability, which would allow Canada to join the cat and mouse game played by British, Soviet and U.S. nuclear submarines in waters where Canadian sovereignty is disputed by friend and potential foe, is one of the items that naval planners want incorporated into the new submarines.

Canada's three British Oberon class submarines, introduced between 1965 and 1968, must stay on the fringes of the ice pack and cannot play the game. Like all conventional craft, which run on electric power when submerged, they can cruise at slow speed for only three days before surfacing to recharge batteries.

Captain Dent Harrison, head of the Canadian submarine team, said: "I'm leading a conventional submarine project." But he conceded that for a safe under-ice voyage of six days — the minimum endurance that sources say naval doctrine planners in Ottawa are talking about — a way has to be found to do the recharging without using air to run diesel generators.

There are three potential non-nuclear solutions: the Stirling engine, now under development by Sweden; the fuel cell system, which West Germany is working on; and the British recycled diesel motor.

Submariners complain that these experimental systems involve stores of highly explosive oxygen or oxygen and hydrogen and do not provide the safety margin of power offered by nuclear reactors.

In discussions with Ottawa, foreign companies bidding for the contract have tentatively proposed the use of low-powered reactors to charge the batteries of 2,000-metric-ton oceangoing diesel-electric submarines.

ECS Energy Conservation Systems Inc. of Ottawa, which builds the Slowpoke reactor used by Canadian research institutions, has already produced a low-power design to be used in the world's first nuclear-powered commercial submarine.

Alan Kastner, executive vice-president of ECS, confirmed that his company has signed an agreement with Vickers Shipbuilding and Engineering of Britain, Rotterdam Dry Dock of the Netherlands and Thyssen Nordseewerke of West Germany to study the feasibility of similar systems in future Canadian navy boats.

Two other competitors, HDW/IKL of West Germany and Kockums AB of Sweden, appear to be wedded to the alternative tech-

... Mr. Kastner said. French and Italian builders are also in the race.

The Canadian "mini-nukes" would have a submerged cruising speed of about five knots, which is about the same as that of a conventional diesel-electric sub but is much slower than the speeds attained by huge full-nuclear submarines.

But speed is not as important for a navy committed to patrolling an imaginary barrier as it is for submarines required to make long ocean voyages to enemy waters. Submarines running on electric power supplied by small reactors will be among the quietest craft in the ocean, according to Mr. Kastner.

Sensor-fooling hull coatings, the equivalent of aircraft stealth technology, are being offered by at least one builder — Vickers — to make the Canadian submarines even harder to find.

If plans for a larger submarine force are approved, it will please U.S. critics who complain that Canada is an underwater wimp.

Bill Lind, president of the Military Reform Institute in Washington, recently said Canada had assured itself a spot as a 10th-rate navy by entering a program to acquire new patrol frigates instead of diesel-electric submarines.

Not all U.S. analysts take this line. Michael McGwyre, senior fellow of the Brookings Institution in Washington, said the frigates are needed to protect North Atlantic supply lanes in the event of war.

But he also said a Canadian submarine force with under-ice capability — not a three-vessel "clockwork mouse" fleet that is only good for training purposes — is a politically sound idea.

The United States demonstrated its contempt for Canadian claims to sovereignty last year by sending an armed icebreaker through the Northwest Passage.

And while the latest Soviet submarines are more likely to fire ballistic missiles from home waters in the event of war, the game of tag continues under the ice.

"Canada is like an exclusive suburb where you are allowed to have your own lawn mower — but if you don't cut your grass, someone else will," Mr. McGwyre said.

If Ottawa does choose to build a submarine fleet that can operate under ice, plans for construction of a huge new icebreaker — designed specifically to "fly the flag" in disputed Arctic waters — will be jeopardized.

At the same time, plans for construction of a third batch of patrol frigates — the first batch of six is under construction and the second is well advanced — would likely be shelved.

The fiercest competition for Canadian submarine contracts is expected to be between the West Germans, the world's leading exporters of submarines, and the British. Both are using experience gained in the Falklands campaign to sell their products.

HDW/IKL, which is building a 2,000-ton submarine, supports Argentine claims that a smaller German-built diesel-electric submarine penetrated the screen around British aircraft carriers in the South Atlantic and, after unsuccesfully firing torpedoes, eluded the hunters for 20 hours.

The other German builder, Thyssen, won a contract to supply six Type 1700 submarines to Argentina. Officials of the Argentine atomic energy program say the Type 1700 is suitable for conversion to nuclear power, but so far the cost has pro-

hibited such a move.

Vickers Shipbuilding, ... sold by state-owned British shipbuilders in the biggest ... buyout in British history, is ... rating technology used in the ... struction of Vickers-built ... Navy nuclear submarines to a ... conventionally powered hunter-killer submarine.

The Royal Navy has already ordered four of the 2,400-ton Upholder class boats, which the firm's company says is the natural successor to the Vickers-built Oberon class that Canada owns.

The new management team at Vickers is still smarting over the loss of a potential six-submarine order for Australia, which has awarded project definition contracts to HDW/IKL and Kockums.

Frank Noah, commercial director of Vickers, said the previous management "shot itself in the foot" ... was gratuitous in its approach to Australian industry and ... respond with a compliant design.

The mistake isn't about to be repeated in Canada. Vickers personnel have been visiting Ottawa for the past nine months. The latest mission was led by chairman ... David Nicolson, who said in an interview that Canadian content could top 60 per cent and that Canada could become a supplier of submarine parts in future British projects.

He named the Montreal, Lauzon, Que., and Vancouver shipyards owned by Versatile Corp. of Vancouver, Marine Industries Ltd. of Montreal and Saint John Shipbuilding Ltd. as potential Canadian partners.

The work will not come in time to help the industry out of its current order book crisis. It will take up to 3½ years to select a builder, with construction to start in the spring of 1990.

/9274
CSO: 3120/41

CANADA

GOVERNMENT ENDS DAILY RADIATION TESTING OF CHERNOBYL FALLOUT

Toronto THE GLOBE AND MAIL in English 3 Jun 86 p A8

[Text]

OTTAWA

The Government has stopped daily radiation monitoring of air, rain and milk that began after the Soviet nuclear accident. "The levels are decreasing so significantly that it isn't warranted," Carole Peacock, a spokesman for the federal Health Department, said yesterday. The Government began the checks after an explosion and fire at Chernobyl, on April 26, which sent clouds of radioactive debris around the globe. The Government will run weekly checks on milk until the end of June and will continue weekly air and rainfall monitoring. Testing for radiation in produce has been stopped. The most recent data at most of the 28 air-monitoring stations across the country show levels of radioactive iodine-131 about 10 times lower than they were in mid-May. While concentrations of iodine-131 have dropped in air and rainfall samples, levels in milk have generally fallen more slowly or have remained constant. However, officials say there has been no threat to health in any cases where iodine-131 was found.

/9274
CSO: 5120/42

CANADA

SKEPTICISM EXPRESSED ABOUT NUCLEAR SAFETY AFTER CHERNOBYL

Public Opinion Survey

Toronto THE GLOBE AND MAIL in English 4 Jun 86 p A1

[Text]

OTTAWA

Canadians do not believe assurances by the nuclear industry and the Government that nuclear power is safe, a post-Chernobyl public opinion survey shows.

The poll, conducted by Angus Reid Associates between May 10 and 13, indicated a majority of Canadians think a major nuclear accident in Canada is a good possibility over the next 10 years. The survey was part of a larger poll conducted for six newspapers.

The Canadian Nuclear Association admits it has some work to do to improve its image, but vice-president Ian Wilson said yesterday that a negative response to nuclear power is to be expected after an accident like that at Chernobyl on April 26.

The accident in the Ukraine released clouds of radiation that were detected as far away as Canada.

Even before Chernobyl, the association was laying the groundwork for a $3-million, three-year public relations and advertising blitz, Mr. Wilson said.

Almost three-quarters of the 1,603 people who responded to the telephone survey said the Government is not telling the public the full story about nuclear safety. The poll is considered accurate 95 per cent of the time within 2.5 percentage points either way.

A United Nations panel said last week that the nuclear industry has lost the confidence of the public in most countries. It also said the world must develop reactors that are "inherently safe rather than inherently unsafe."

Norm Rubin, a nuclear critic and researcher for Energy Probe in Toronto, said the system regulating nuclear power has "very little legitimacy to it and the poll establishes that."

Mr. Rubin said decisions about nuclear energy are taken behind closed doors by the Atomic Energy Control Board, Ontario Hydro, and Atomic Energy of Canada Ltd. The control board is the federal regulator of the nuclear industry, Ontario Hydro is the country's biggest user of nuclear power and Atomic Energy of Canada is the federal Crown corporation that designs and markets the Canadian-made Candu reactor.

Mr. Rubin agreed that the results may have been affected by Chernobyl, but as a pessimist about nuclear safety, he feels that "1986 may be more typical than the industry would like to admit."

The Reid poll said that nationally, 52 per cent of Canadians consider a serious accident likely, 15 per cent think such an accident is very likely and 37 per cent think it is quite likely. On the other hand, 10 per cent believe it is not at all likely and 31 per cent think an accident is not very likely.

Mr. Wilson blamed much of the industry's woes on the media, saying they tend to report on nuclear power only when something goes wrong and then give the lion's share of the coverage to critics.

As for the perception that the Government is keeping the truth from the public, Mr. Wilson said all the information is available.

Mr. Rubin said the federal Government should open up the regulatory process by appointing more members of the public to the control board and forcing the board to hold public hearings and make its decisions in public.

Nuclear Association, Society Conference

Ottawa THE CITIZEN in English 10 Jun 86 p A10

[Text]

TORONTO (CP) — A meltdown of public confidence will doom Canada's nuclear industry unless the sector acts quickly to repair the damage, a national conference of the troubled sector was warned Monday.

A massive public relations effort is needed to dissipate the dark cloud cast by the reactor accident at the Soviet Union's Chernobyl plant, officials concede, but so far the industry is unable or unwilling to put up the cash.

"The image of the nuclear industry seems to be going down for the third time," Basil Beneteau, a retired senior executive with Northern Telecom Ltd., warned the annual joint meeting of the Canadian Nuclear Association and Canadian Nuclear Society.

"Chernobyl has awakened the latent fears of the doomsday crowd," creating the potential for suspicion, and perhaps even hatred, of the industry. "If we don't turn it around, spokesmen for the nuclear industry will be the pariahs of society."

An effective public relations campaign would cost at least $2 million a year, estimated Bill Killough, secretary of the nuclear association's public and government affairs committee.

"I agree with the need to do this as an industry. . . but it's what you can afford to do," he said in an interview.

Association members have so far agreed only to a modest public relations program that will spend $300,000 over the next three years, most of it aimed at politicians, the media and other "opinion leaders," said Bill Killough.

The nuclear association, with about 125 member companies, was founded in 1960 to promote the development of peaceful uses for nuclear energy. The smaller nuclear society, now eight years old, takes a more technical approach, focussing on the exchange of scientific and engineering information.

Canada's nuclear industry was worth $3.6 billion and employed 31,000 in 1984, the association says. But slumping sales for its main product, the Candu reactor, have since forced substantial layoffs.

Canada has bids in on a record number of reactor projects but no new orders are in sight, the conference was told.

Further Conference Details

Ottawa THE CITIZEN in English 11 Jun 86 p E 4

[Article by April Lindgren]

[Text]

TORONTO — A nuclear disaster worse than the one that killed 26 people at the Chernobyl power plant in the Soviet Union shouldn't be ruled out, nuclear industry spokesmen said Tuesday.

"This may not be the worst accident we'll see in the next decade or century," said Carl Goldstein, vice-president of the United States Committee for Energy Awareness, a lobby group for the nuclear industry.

In Canada, a meltdown of the CANDU reactor that is used in plants throughout the country is a possibility if all the backup systems fail, said Ontario Hydro vice-president Bill Morison.

The two men were part of a panel addressing the Canadian Nuclear Association's annual conference. The association represents about 120 companies involved in the Canadian nuclear industry.

The more than 400 industry representatives attending the two-day conference were preoccupied with the public relations damage caused by the April 26 accident at Chernobyl.

Spokesmen for the industry in Canada, the United States and Britain said public fears about nuclear power increased substantially after the damaged Chernobyl reactor spewed clouds of radioactivity into the atmosphere.

These concerns forced changes in publicity campaigns planned in all three countries.

In Canada, a $600,000 campaign was going to be devoted to promoting awareness of the industry's economic importance, but the public's safety concerns will now get more attention, said Norm Aspin, president of the Canadian Nuclear Association.

Goldstein said the American nuclear industry, which spends $10 million annually on publicity, has cancelled advertisements promoting nuclear power. They have been replaced with material relating directly to the Chernobyl accident including things such as the difference between Soviet and American reactors.

CANADA

BRUCE STATIONS RADIATION LEAK, TUBE DEFECT REPORTED

Overnight Accident

Windsor THE WINDSOR STAR in English 5 Jun 86 p A6

[Text]

TIVERTON, Ont. (CP) — A radiation hazard caused by a minor accident sent four pregnant office employees home Wednesday from the Bruce Nuclear Power Development, Ontario Hydro said.

Spokesman Dave Stevens said the radiation at the administration office near this Lake Huron community was double the normal level after an overnight accident. There was no danger of radiation to areas outside the station, he said.

"There's nothing in the environment to show that a gamma beam was there," he said. "It's not the same thing as contamination."

The accident exposed tubes inside the reactor which emit 80 to 120 rems of radiation per hour, Stevens said. The radiation is in the form of a gamma ray, similar to a beam of light, and can be easily shielded.

A unit alert was declared Tuesday night after the accident during planned maintenance of Unit 6 of the Bruce B nuclear generating station, which opened in September 1984.

Workers moving the tubes were exposed to 100 millirems of radiation, "not an unusual exposure," Stevens said. "It doesn't constitute a hazard for those people."

Stevens said two damaged tubes fell while being moved into a protective flask. The tubes were lifted by a cable back into the larger flask late Wednesday and were to be shipped out and examined.

Tube Defect

Toronto THE GLOBE AND MAIL in English 6 Jun 86 p A19

[Article by Thomas Claridge]

[Text]

A manufacturing defect is being blamed for the rupture in a pressure tube at Ontario's Bruce nuclear power development that has left a reactor out of service since March 28, and similar defects have been found in other tubes.

Spokesmen for Ontario Hydro and Atomic Energy of Canada Ltd. said yesterday that the defect, which escaped detection during several manufacturing and installation processes, caused tiny cracks to develop at several points near the end of the tube. One of the cracks started to leak, and the leak suddenly became a torrent during a high-pressure test.

Hydro spokesman Michael Williams said the cause was determined during a metallurgical examination of the tube at AECL's laboratories at Chalk River, Ont., and subsequent checks disclosed similar defects in at least three other tubes produced for Candu reactors.

One was found in another tube that developed a leak in the same Bruce reactor, and the other two were caught during tube installations at Bruce and at Cordova, Argentina.

The Hydro spokesman said all four tubes were manufactured at about the same time, and all were extruded from near the top of zirconium ingots forged by a division of Teledyne Inc. in Albany, Ore.

Mr. Williams said Hydro has identified 20 other tubes that may have similar defects. Fourteen of the suspect tubes are in the shut-down Bruce Unit 2 reactor and there are two in each of the other three reactors of the Bruce A generating station.

The 14 tubes in Unit 2 will be inspected before the reactor is restarted. Similar inspections in the other three reactors will take place during scheduled shutdowns.

The Unit 2 shutdown, which originally had been expected to last about a month, probably will last more than three. Apart from the additional inspection work, Hydro crews face two major cleanup tasks as a result of the March 28 accident. They must locate and remove a missing uranium fuel pencil, and dry out a crucial leak-monitoring system in the reactor.

Mr. Williams said the highly radioactive fuel pencil, one of six that broke loose from fuel bundles when the pressure tube ruptured, is believed to be lying on the bottom of the reactor but has not been spotted in initial scans by a miniature television camera.

The leak-monitoring system involves circulating dry gas through the gaps between the reactor's 480 pressure tubes and outer calandria tube. Flooded during the accident, the system is still moisture-laden and Mr. Williams said it may take several weeks to dry out to the point that it will once more be able to detect a small pressure-tube leak.

/9274
CSO: 5120/41

CANADA

CHALK RIVER WASTE SITE EYED FOR NEW REACTORS

Vancouver THE SUN in English 30 May 86 p C7

[Text]

CHALK RIVER, Ont. — Chalk River Nuclear Laboratories, near this community 160 kilometres northwest of Ottawa, may become a storage site for the waste from a new family of small nuclear reactors being developed by Atomic Energy of Canada Ltd.

Metro Dmytriw, an Atomic Energy spokesman, says the waste would be produced by the Slowpoke-2 reactor being designed to produce heat for small communities, replacing oil and other conventional fuel systems.

Atomic Energy would offer waste disposal service as an incentive to reactor sales. The new reactor is not yet ready for delivery, although seven Slowpoke research reactors are currently operating across Canada, producing isotopes for medical experiments or being used by engineering and metallurgy students.

Most Chalk River leaders are not worried about the waste.

"We have some storage of nuclear waste here now and it's been handled very well," Chalk River Reeve Bob Seguin said Thursday.

"They are the experts in the field and they've kept us informed . . . We have no fear of anything that's going on at (the lab)."

Lyall Smith, mayor of nearby Deep River and a research technologist in the lab's nuclear physics branch, also expressed confidence in the storage operation.

"We have been handling radioactive waste for over 40 years. We have good people who are concerned about the environment and monitor the situation constantly."

Some people aren't as keen.

"The more radioactive stuff we get, the greater the dangers if anything went wrong in storage," county warden Russell Leach said.

/9274
CSO: 5120/43

CANADA

SEVEN PROTESTORS ARRESTED AT ELDORADO NUCLEAR

Ottawa THE CITIZEN in English 10 Jun 86 p C2

[Article by Laura Eggertson]

[Text] Ottawa police charged seven protesters with trespassing Monday during a peaceful demonstration at Eldorado Nuclear Ltd. on Albert Street.

About 30 people from the Non-Violent Direct Action Network Against Nuclear and Military Racism picketed the head office, claiming the Crown corporation is polluting the environment and its uranium mines and promoting apartheid by doing business with South Africa.

The seven blocked the main doorway to the building, refusing to leave when police told them they were trespassing.

"Our first demand is that Eldorado close down its mine in Wallaston Lake (Sask.)," said group spokesman Michel Desrochers.

Its second demand called for immediate cancellation of Eldorado's uranium-import contract with Namibia. Desrochers said the uranium is refined for the South African government.

The company processes uranium from Namibia, but it has no connection to South Africa, said Dave Smith, Eldorado's director of information.

The seven people are part of a civil disobedience contingent and had declared their willingness to be arrested for the cause, Desrochers said.

They were released after Monday afternoon.

/9274
CSO: 5120/43

BULGARIA

POWER SUPPLY, SAFETY MEASURES AT KOZLODUY DESCRIBED

Sofia RABOTNICHESKO DELO in Bulgarian 29 May 86 p 4

[Article by Corresponding Member Professor Nikola Todoriev, chairman of the Energetika Economic Trust: "Economizing on Energy"]

[Text] Last night Corresponding Member Professor Nikola Todoriev, chairman of the Energetika Economic Trust, spoke on Bulgarian television. The topics of the discussion included problems of power supply. The winter is behind us. Although it was warmer, nevertheless it was a winter season with all of its hardships. The discussion also included the work of the Kozloduy Nuclear Power Plant.

What are the results of the steps taken to normalize the country's power supply? Let me openly say that they are very good, Professor N. Todoriev said in the beginning. I do not wish to burden our audience with many figures, but let me say that during the first quarter of 1986 electric power consumption in the country was significantly lower than in 1984, which was characterized by very frequent interruptions of power deliveries to the consumers. At the same time, I must emphasize that there was absolutely no interruption of electric power over the past autumn and winter, absolutely none. I do not include in this a few breakdowns, which are bound to occur in the operation of such a complex system.

Let me immediately emphasize that despite such a reduced consumption of electric power, there has been a significant growth of economic indicators in our industry in the first quarter, so that we have actually achieved one of the main tasks of our energy policy: a gradual decline in power consumption per unit of output in our country.

Before I say a few words on the preparations we are making for the forthcoming autumn and winter, let me take this opportunity to thank all Bulgarian citizens who showed exceptional understanding for the introduction of this controlled power consumption system.

I would also like to thank Bulgarian television for its continuing and active participation and support of steps taken in connection with the preparations for and conversion to the autumn-winter system, and to all mass information media and public organizations which concentrated all their efforts on the

solution of this problem. Naturally, I also thank the Bulgarian miners and power workers who spared neither time nor efforts to ensure the absolutely normal and rhythmical power supply to the country over the past period.

What could we expect now? We cannot say that everything is in order, for such a system will always have problems which, if ignored today, and if resolved belatedly, would make them very difficult and will sometimes require double the amount of forces and funds. That is why we are steadily preparing for the winter period. Preparations for the next autumn and winter are once again manifested in the increased volume of repair operations. We want to have absolutely adequate and stable power capacities within our system when the cold seasons arrive. Let me also say, however, that it is quite possible, particularly as time goes by, and the dry season comes, that in the next autumn and winter as well we may not have at our disposal the generating capacities of hydroelectric power plants.

Consequently, once again we must be ready to work under more difficult conditions. That is why we are making preparations not only within the power system but also within the systems of all power consumers to be prepared for the winter. I believe that such preparations should be made by every Bulgarian citizen as well. Increasingly, technical solutions are being applied, lowering power consumption even with high-volume industrial output.

Let me point out once again that the efficient and economical utilization of energy, in all its varieties, remains both the strategy and the tactic of our energy policy, the more so after the resolutions of the 13th BCP Congress formulated the type of tasks related to the accelerated development of our economy, demanding that we prevent the wasting of energy, which is so hard to obtain and so costly to the state.

In this connection, we shall continue with the stipulated procedure for regulating and limiting population consumption. We are drawing conclusions based on the limiting of electric power consumption in the consumer sector during the past winter and all the failures and, if I may say so, all special cases which appeared. We tried to solve such problems and to improve the system in order to prevent any kind of harm or injustice affecting the individual citizen. However, I would also like to emphasize that the approach to the solution of energy problems, which was characteristic of the past autumn and winter, should be continued. We are trying to distribute the use of all sources of energy in such a way as to obtain the highest possible results and, above all, a rhythmical and reliable power supply.

How will the Bulgarian power industry develop during the 9th 5-Year Plan? The main trends in the development of our power industry remain the same. It is given priority compared to the development of the other industrial sectors. This 5-year plan the expansion of the Kozloduy Nuclear Power Plant will continue; start-up operations of the fifth block will be undertaken by the end of this year. We shall continue with building the sixth power block. We are undertaking the construction of the nuclear plant in Belene and the accelerated building of the second stage of the Belmeken-Sestrimo-power storing Chaira plant power system, the first unit of which should be completed by the middle of 1988. A third expansion of the Maritsa-Iztok 2--the Maritsa-

Iztok Combine--is under construction, the first block of which is scheduled for completion in 1989, as well as some additional heat and electric-power generating capacities. We are also continuing the building of additional capacities in our coal-extraction industry. As you can see, in addition to importing energy we are relying on the increased share of local resources to meet power requirements in the next 5 years.

What is the situation with the safety of our nuclear electric power plant?

The first block of our nuclear electric power plant has been in operation for almost 12 years. It was built in accordance with the concepts and technical possibilities of the time when its construction was undertaken. Let me immediately add that the four blocks in operation in Kozloduy are of the core-reactor type, different from those in Chernobyl. Kozloduy has water-water reactors.

All the necessary systems to ensure the safety of the operation of the turbines in Kozloduy are in triplicate, both in terms of cooling, control and power supply. Consequently, all possible steps have been taken to ensure the absolutely safe and reliable work of the plant. Its indicators classify it among the best power plants of its kind in the world.

Let me also mention that many citizens remember the severe earthquake in Vrancha, in 1977. At that time the nuclear power plant experienced and earthquake shock stronger than the one it was designed to withstand. Nevertheless, it did not interrupt its work. Consequently, the equipment in Kozloduy has a certain reserve even for such cases. Nevertheless, all new developments in nuclear technology used in the production of electric power, above all those aimed at upgrading work safety, are being consistently applied in Kozloduy.

After the earthquake the entire equipment was strengthened with additional shock absorbers--reactors, steam pipes and steam generators (I shall not enumerate here all units). Control systems were improved and expanded. A number of additional measuring instruments were installed to record signals of movement in the earth's crust. I shall not go on listing other technical problems.

The Soviet Union, which supplied this equipment, has steadily worked on its improvement. All new developments are immediately installed. I must point out that even before the Chernobyl breakdown, an absolutely identical program was suggested for making some additions during repairs of individual generators, aimed above all at upgrading operational safety. Taking also into consideration the fact that we have a highly trained staff running this plant, which always includes Soviet specialists, who are very well familiar with the systems, we can trust the work of the installed Kozloduy facility. As far as the expansion is concerned, we are undertaking the building of qualitatively new types of reactors of the same water-water type. However, their unit capacity is 1,000 megawatts and they have been built on the basis of exceptionally strict safety requirements. Here as well all cooling, control and electric power supply systems are in triplicate. All processes are absolutely automated. We must also bear in mind that the new units have

safety protection so that whatever breakdown may occur in the reactor part of the plant, even if radioactive steam is released, it will not go into the environment. It will remain in the locked premise inside the reactor, which is of a size able to withstand exceptionally high external and internal pressures. For the sake of comparison, let me emphasize that its dimensions are such that should an airplane crash on the roof of the reactor the roof can withstand the shock. It has been so designed.

Consequently, the problems of work safety of the second section of Kozloduy have been resolved on a qualitatively new level, consistent with current achievements and concepts of work safety of such nuclear power plants.

There is no reason for mankind to abandon the further development and utilization of nuclear energy for peaceful purposes, for this is its power alternative, Professor Todoriev concluded.

5003
CSO:2200/127

HUNGARY

COMPARISON OF VVER-440, VVER-1000 NUCLEAR POWER PLANTS

Budapest ENERGIA ES ATOMTECHNIKA in Hungarian No 1, Jan 86 pp 1-6

[Article by Dr Gabor Bede, university docent, Heat and Systems Technology Institute, Budapest Technical University: "VVER-440; VVER-1000... An Attempt At Comparison"]

[Text] The VVER-440 and VVER-1000 reactor blocks developed in the Soviet Union are the bases for the nuclear energy development plans of the CEMA countries. Earlier plans prescribed construction of the VVER-440 installations and present thinking prescribes construction of VVER-1000 type nuclear power plant units. (According to our present information about 40 VVER-440 type nuclear power plant units will operate in the CEMA countries; one cannot yet estimate today the total volume of VVER-1000 type blocks to be built.) Since the VVER-440 is the result of a long development and the VVER-1000 is--so far--the last station on the same road it seems useful to compare the two systems, at least in a general way, to one another and to the solutions used in other types with similar performance.

Development and Characteristics of the Equipment Used

Reactor development for Soviet energetics began in practice at the end of the 1940's. The first big achievement was the 5 MW commercial nuclear power plant block which went into operation in Obnyinsk in 1954; it was built with a graphite moderator, water boiling reactor. (This was the world's first nuclear power plant for commercial purposes, although not the first reactor block to produce electric power, for this was the EBR-II fast reactor system in the United States.) The further stations of the Obnyinsk development were the energetics blocks at Byeloyarsk and construction of the RBMK type nuclear power plant units recently begun and now under way.

Not even in the Soviet Union (nor in the United States, the other country developing reactors) did the development of water neutron slowing medium energetics reactors get started in the direction of "dry land" applications. The first more significantly powerful energetics units appeared with the pressurized water, thermic reactor system used on the Lenin "atom powered" icebreaker in the Soviet Union. (It appears that less significance was given to boiling reactor development work; the results of it are just now being used, in Gorkiy and Voronyezh, in the AST-500 heat providing systems developed

from the VK-50 basic type.) The development of commercial water-water energetics blocks can be followed most simply via the blocks of the Novo-Voronyezh Nuclear Power Plant. (The water-water energetics reactor is identical, in regard to the Soviet VVER type, with the systems designated pressurized water or, elsewhere, PWR. We will use both designations in the text.)

We summarize in Table 1 the most important characteristics of the primary and secondary cycle--for the blocks in the Novo-Voronyezh Nuclear Power Plant and for newer ideas. It can be seen from the table that both the VVER-440 and VVER-1000 systems are the result of a deliberate development. The manufacturable dimensions of the reactor container determined the value of the primary cycle pressure which could be used, that is the largest permissible temperature of the cooling medium. The fuel is a type developed earlier, only the number of elements used in the heating element changes.

Some Data on the Development of the VVER Reactor Type

	VVER-210	VVER-365	VVER-440	VVER-1000
Electric output capability, MW	210	365	440	1,000
Primary cycle pressure, bar	100	105	125	160
Temperature of cooling water on entering reactor, Celsius	252	252	268	289
Warming of cooling water in reactor zone, Celsius	21	28	33	33
Cooling water flow in primary cycle, cubic m per hour	36,500	49,500	42,000	80,000
Number of cooling cycles	6	8	6	4
Diameter of reactor container, m	3.8	3.84	3.84	4.5
Height of reactor container, m	11.14	11.80	11.80	10.85
Corresponding reactor zone:				
diameter	2.88	2.5	3.2	3.2
height	2.5	2.5	2.5	3.5
Diameter of fuel rods, mm	10.2	9.1	9.1	9.1
number in one heating element	90	126	126	331
Number of heating elements in zone	343	349	349	151
Number of control rods in zone	37	73	37	109
Average output density in zone kW per cubic dm	46	80	83	111
Maximum fissionable material enrichment, percent	2.0	3.0	3.6	4.4
Maximum burn level, MW day/kgU	13	27	28.6	40
Boron control	none	created later	has, but not used	has
Gate valves in cooling cycles	6 x 2	8 x 2	6 x 2	none
Method of maintaining volume equalizing pressure	gas	steam	steam	steam
Steam generator type	horizontal	horizontal	horizontal	horizontal
Number of turbines	3	4 1	2	2 or 1
output capability, MW	70	70 80	220	500 1,000

The most important change between the VVER-440 and VVER-1000 types is to be sought in the formation of the control rods. Ending with the VVER-440 the outer dimensions of the control rods are the same as the outer dimensions of the heating elements; in the VVER-1000--as in the solution used in other PWR types--"clustered" control rod groups are used, a solution which makes possible a zone height-length saving in the height direction in the reactor container.

The change in the formation of the control rod is accompanied by a disappearance of the outer, rigid wall of the heating element. Additional consequences followed from these two circumstances. Let us look at these in a little more detail.

1. The method of control rod formation--up to the VVER-440 type--results in a control rod with external geometric dimensions identical with the fuel. Pulling from the reactor zone a control rod of the same size as the fuel substantially changes the fuel/slowing medium ratio at that place, the number of extra fissions caused by the significant thermic neutron flux increase resulting from this would lead to an impermissible output increase in the region of the "water hole" created. Eliminating the "water hole" is the solution to avoid this; and the optimal procedure for this purpose is "extending" the control rod with fuel. Such a selection of a control rod-fuel combination gives a minimal length of the reactor container three times the reactor zone.

The identity of the dimensions of the control rod and the fuel makes it possible to turn the fuel, having a hexagonal cross section, any number of 60 degree angles during zone reloading without hindering the total loading of the zone. (If the control rods are introduced in amongst the fuel, as in other types of first generation PWR reactors, the fuel elements can be loaded into the zone only in definite positions during zone reloading.) As long as zone reloading cannot be pefectly automated this procedure is the only possible method. It is a circumstance of similar importance that regulator organs placed in amongst the fuel make necessary the manufacture of asymmetrical fuel elements, which further complicates the programming of zone reloading. (Certain fuel elements could be placed only in certain places!) Control rods of the same size as the fuel or the extension then used also require use of guide tubes under the reactor--to eliminate vibration caused by the flow of the cooling medium. The flow moderating effect of the guide tubes is very favorable (as in the systems used in wind tunnels); but this results in an increase in the amount of material to be built in.

2. As a result of fuel element formation with a hermetic wall to the cooling medium, the same cooling medium mass flow takes place along the entire length in each fuel element. This circumstance makes possible a so-called thermohydraulic dimensioning to the hot channel; that is, in the course of the thermotechnic analysis it is not necessary to know precisely the output density distribution; it is true that in this case the omissions made in the direction of safety result in significantly oversize solutions.

3. An "insensivity" to the turning of the fuel elements can be achieved, if we want to improve the solution, so that the control rod (or rods) must be placed in the fuel element, but it is possible to move them only in the symmetrical axis of the element. This requirement can be satisfied with the "clustered" control rods built into the fuel element and used in the VVER-1000 and other second generation PWR power plant blocks. Since the material of the control rod is strongly neutron absorbent the control rod is to be formed with a large surface/volume ratio. This requires a sheet or small radius cylinder--tube--formation, but the mechanical requirements arising in the course of a control rod drop necessary to attain fast shutdowns requires a similar cross section! But if we build the control rods into the fuel elements care must be taken that, during reloading, it should be possible to ensure a subcritical zone in every case even without control rods; this can be realized easily with the already developed boron reactivity control.

4. The hermetic wall to the cooling medium ensuring the mechanical unity of the fuel element becomes unnecessary with use of the "clustered" type control rod system, because then the guide tubes of the small diameter absorptive rods are sufficient to ensure the mechanical unity of the heating element. The ability to leave out the heating element covering not only means a decrease in extra neutron absorption (this decreases the amount of fissionable material to be used!), but also that cooling medium flow and mixing not controlled from outside comes into being among fuel elements with different thermal loads. (The greater warming of the cooling medium arising at places with greater thermal load results in greater volume changes and greater flow speed, and this creates greater local "dynamic" pressure, that is, in the case of the same "total pressure" it creates smaller "static" pressure, which results in a "cross flow" of the liquid--the water.) It can be seen that in this case the dimensioning of the hot channel must be based on a very large number of measurement results (one must know the mixing relationships precisely); thus a more complicated analysis--which can be mastered with computerized methods--is unavoidable in order to analyse the cooling relationships of each fuel rod. The fuel element without a hermetic wall well serves the development of cooling medium mass flow corresponding to the distribution of the fission density, thus--from the strictly thermohydraulic viewpoint--it aids the development of an average value for the cooling medium temperature as it leaves the zone. The new fuel element type certainly saves an increase in reactor container length corresponding to the height of the zone (and this is the case in fact); the reactor container of the VVER-1000 contains nothing "downward" but the structures below the reactor zone and a minimal amount of equipment necessary for other reasons. In addition the nonhermetic heating element covering is also advantageous under breakdown conditions (see below). As a result of the greater U-235 enrichment used in the fuel elements one can achieve a greater burnout level, and the volumetric output density increases. The increase in size of the fuel elements--together with the "clustered" control rod design--results in a more even output distribution. And the dimensions of the active zone are closer to the neutron physics optimum than in the case of the VVER-440.

The VVER-1000 type energetics block uses four primary cooling cycles as opposed to the six cooling cycles of the VVER-440. The reason for the change is obvious: The fewer the cooling cycles the less stainless steel surface to be built in (meaning greater corrosion and radiation safety). We will return to an analysis of the safety of the solutions.

It is worth noting the development of views pertaining to the ability to isolate the reactor cooling cycles, in the case of both the VVER-440 and the VVER-1000:

--The priority of an isolatable cooling cycle was based primarily on doubts pertaining to the availability of the steam generator. It appears that the observations of those who wanted to reduce damage due to an accidental cold start of the isolated cooling cycle correctly prevailed, because it is "simpler" to repair an entire reactor system, when shut down, and after suitable preparations, than to repair an individual subsystem, but with an immediate time limit.

--The VVER-440 units in Hungary do not permit isolation of the cooling cycles, nor is there a possibility in the VVER-1000 units for a separate isolation of the cooling cycles.

The pressure maintaining system for volume equalization is based on steam cushion pressure, instead of the gas cushion pressure used in the first types. Maintaining pressure with a steam cushion is a solution long used in other systems (for example in central heating systems), and it is better suited to operation of the primary cycle than the gas cushion version. (Let us note only as an example that in the case of steam cushion pressure control a reduction in pressure can be solved very simply by changing the condensation state, with water sprayed in from the cold line of the cooling cycle; the pressure of the cold cooling cycle line is greater than the pressure in the volume equalizer by a value corresponding to at least the total pressure drop of the reactor container so, ultimately, the primary cycle can always use its own medium.)

Today the number of turbines used in the secondary cycle belongs primarily among the problems of availability. In the course of technological development, however, the situation was determined primarily by the size of the largest turbine which could be built in at the time. It can be said as a rough estimate that the cycle efficiency of PWR type nuclear power plants is about half the cycle efficiency values for modern conventional power plants. The differences deriving from this in the steam flow--processed in the turbine--result in the fact that, again ignoring a number of factors, the number of low pressure housings for turbines used in PWR nuclear power plants double compared to conventional power plant steam turbines of the same output. It also follows from the foregoing train of thought that--from the design viewpoint--a nuclear power plant steam turbine can be compared with a conventional steam turbine of roughly twice the output. At the time of the development of the VVER-440 the greatest output capability of turbine types used in Europe was 500-600 MW (there were larger capacity machines, but not

yet in series manufacture), so the 220 MW saturated steam turbine used then could not be regarded as not being modern. In the VVER-1000 type block which can be regarded as most developed they use a single 1,000 MW capacity steam turbine. (It could be compared to a conventional machine with a capacity of 1,800-2,000 MW, which is the "peak" today!)

We must also talk separately about the steam generators used in the VVER type nuclear power plants. The nuclear power plant steam generator--a water heated steam boiler--can be compared most simply with the steam transformer formerly used in conventional energetics:

--In regard to its design a steam transformer can have horizontal or vertical heating tubes. The former type can be characterized by less surface (and volume) steam output, but by simpler maintenance conditions and fewer corrosion problems. The latter appears to be "more developed" but maintaining it is more difficult and it is more sensitive to corrosion on the secondary side. (This can be seen simply--there is always under-cooled liquid in the bottom of the vertical heating pipes so even with the best water preparation the remnant contamination condenses here.)

--The horizontal arrangement for a steam generator appears to be the "conservative" solution, and the vertical arrangement "more modern." (One can get greater capacity in the same space.) The space requirement--in base area--is smaller, the moisture content of the steam produced is lower (and can be reduced more easily too) and a number of other advantages could be listed.

Thus far they have used horizontal arrangement steam generators in the Soviet developed VVER nuclear power plants while they use vertical arrangement equipment in the Western PWR nuclear power plants (with the exception of a few "zero generation" systems). It is true that the primary cycle of a PWR planned with a vertical steam generator requires less space. (Or appears to! We will return to a discussion of safety questions.) The fewer steam generators needed is more "elegant" and it results in a pipe schema and primary cycle design easier to review. But let us look at a few other factors based on actual data:

--The most developed type of vertical arrangement is the forced flow steam generator developed by the American firm Babcock and Wilcox. The system can be characterized by really very advantageous operational properties. It is also suitable for production of superheated steam. (One cannot overestimate the advantages of this--from the viewpoint of the turbine.) But, the consequences of the serious breakdown which took place in the TMI-2 nuclear power plant block would have been substantially reduced if the heat capacity of the secondary cycle which could be used in the event of a breakdown had been greater. (There was practically no water available to draw off heat in the forced flow steam generator because of the stopped secondary cycle.)

--The water level height of the vertical arrangement, natural flow steam generators is at least 10 meters. This means that at the lowest level of the secondary side the pressure of the liquid is at least 1 bar greater than the saturation pressure--the fact of under-cooling given. In the Western type PWR nuclear power plants the cause of very many breakdowns recently has been stress corrosion, the cause of the failure of the pipes fixed to the lower

pipe wall of the steam generators. The explanation of the phenomenon is obvious: All the contaminating materials collect in the under-cooled liquid, the use of rolled pipes in the flat wall during manufacture results in quite large remnant stress.

--The larger amount of equipment deriving from the fact that smaller specific steam output can be used in horizontal arrangement steam generators or the larger individual apparatus volumes also mean a greater secondary cycle water volume; this heat capacity can be used very well in a serious situation.

--The present "model illness" of the vertical type steam generators can be regarded as even theoretically excluded because of the geometric formation of the horizontal equipment.

Thoughts About Evaluating Safety

At the beginning of the building of the VVER-440 type blocks in the Soviet Union the nuclear safety thinking--in the area of dimensioning basic assumptions--started from the idea that there was no possibility that a primary cycle line larger than 100 mm diameter should suffer an instantaneous break where the ends of the broken pipe would also shift sideways. It followed from this presumption that in most VVER-440 block reactor buildings the total volume of the so-called hermetical area is about 10,000 cubic meters, which by the above hypothesis is sufficient for reliable isolation from the environment of the primary cycle cooling medium flowing out of the break surfaces--and the energy and radioactivity released. Excluding the possibility of a break in large diameter lines also appears in the standard VVER-440 plans in that the splitting sheet safety ventilation openings of the hermetic area system opening to the environment open outward at an over pressure of 4 bar. (We will not talk here about the technical solutions for reducing pressure in the hermetic system--spraying in water--because we consider the basic principles more important.)

In the course of construction of the Finnish VVER-440 block in Loviisa, on the basis of safety considerations long applied in Western countries, the entire primary system--including the hermetic part--was placed in a hermetic container with a volume of about 60,000 cubic meters. The increase in volume in the hermetic system caused by this outer safety container "makes it possible" to hypothesize even a break in the largest diameter primary cycle pipeline. (More precisely, the dimensioning basic assumption is an instantaneous break in one of the primary cycle cooling water lines and in the cold branch, where it enters the reactor, whatever the cross section of the two breaks, and the consequences thereof.)

A solution deviating from the Finnish one was used in our country in the blocks of the Paks Nuclear Power Plant. As is well known, here, deviating from the standard plans, the hermetic system was developed at the lower level of the reactor building and with the aid of a large cross section tunnel it was linked with a hermetic area beside the building with a volume of about 40,000 cubic meters, so the total hermetic volume increases to approximately 60,000 cubic meters. Obviously the development of the above system was a first step toward uniform application of the basic assumptions of the nuclear safety

judgment, since adopted at the international level. But the question arises: Is this solution really entirely new? In order to answer the question we should review--very roughly--the outside safety container systems used in the world:

--The systems used in Loviisa are also used in PWR nuclear power plants. The variants are: spherical containers made of steel; double walled containers (steel lined reinforced concrete); and the heat withdrawal system in the container can vary (spraying in water, storing large masses of ice, etc.).

--The systems used in BWR nuclear power plants differ from the foregoing primarily in that the strictly interpreted hermetic area is separated from the area of the outer safety container by a water trap through which only the medium can bubble on--obviously in gaseous form.

--In the Canadian heavy water nuclear power plants (for example, Pickering) the role of external safety container is played by a single container with a volume of about 60,000 cubic meters linked with the hermetic area systems of all reactor blocks by large cross section tunnels and kept under a slight vacuum; in the event of an accident the liberated medium can flow into this by opening splitting doors; spraying in water serves to withdraw heat. (A further development of this solution is the system figuring in the plans for the Bruce nuclear power plant in which the water goes, possibly under pressure, from a large volume water tank in the upper part of the container figuring in the typical PWR solution into a pipe system spraying into the hermetic areas.)

If we think about the above it can be easily seen that the solution used at Paks is a combination, block by block, of the BWR systems and the systems used in Canada.

The VVER-1000 reactor block is made with the external safety container used in the PWR nuclear power plants, thus applying completely the guide design principle adopted at the international level. In addition, the container can be made in versions resisting aircraft impact and earthquake--following from the requirements system which has become more detailed in the meantime, in contrast to the domestic buildings of the VVER-440 which do not meet these requirements.

But a study of the circumstances of pipe break type accidents cannot be limited to external safety containers alone; the heat withdrawal that can be attained in the primary cycle is of crucial importance in an analysis of possible releases. The consequences of a cold branch break would develop almost identically with the VVER-440 and VVER-1000 type reactors. It would be possible to avoid a drying out of the zone only by operating the breakdown cooling system. The situation would be slightly different in the case of a hot branch break or larger volume flow taking place elsewhere; the primary cycle volumes of the two types are not in proportion to the ratio of the outputs (the output ratio is more than double with a volume ratio of only 1.2-1.3). In the case of the VVER-440 the volume of the primary cycle contains a relatively large quantity of water so as long as the reactor zone remains under water cooling could be ensured even in the event of a breakdown (this is also well served by the fact that in order to aid the cooling necessary during zone

reloading the steam generators are so placed that they are suitable for withdrawing heat at such times also). This circumstance can also explain the fact that the high pressure breakdown cooling system goes into operation at--relatively--lower pressure (60 bar). (But this was not the design justification (!) because, as we said, during safety design of this type they were still assuming only small diameter pipe breaks.) The smaller relative water quantity used in the VVER-1000 type--as is general in PWR primary cycles--certainly justifies the use of a (really) high pressure zone cooling system. (For this reason the primary cycle contains a "supplementary" container, also called a "breakdown boron solution storage" container, which is connected directly into the reactor or into the cold cooling water branch.)

And finally the availability of a nuclear power plant is a sort of safety question, the safety of the providing of power. Comparing the two units raises the question of single block construction and twin block construction. It is a fact that the two turbine-one reactor solution is unique in world nuclear power plant construction. There is no adequate base for a comparison of availability, for it is well known that operating data on the VVER-1000 blocks are not yet sufficient to prepare statistics which are precise enough, and the VVER-440 block cannot be compared with foreign data.

8984
CSO: 2502/44

HUNGARY

EXPORT OF NUCLEAR MATERIALS, EXPERTISE REGULATED

Budapest MAGYAR KOZLONY in Hungarian No 1, 19 Jan 86 pp 3-5

[Unsigned publication: "Decree 2/1986 (19 January) of the Council of Ministers: Concerning Nuclear Export"]

[Text] On the basis of authority granted in section 26 of Law No I of 1980 on nuclear energy and in section 3 of the 1970 Decree (with the force of law) No 12 which promulgated the treaty--12 June 1968--on preventing the proliferation of nuclear weapons, the Council of Ministers decrees the following:

Section 1

(1) This decree must be applied in connection with the transportation abroad of nuclear materials, installations, apparatus, expertise, and specific non-nuclear materials, if the destination of such shipment is a country which does not have nuclear weapons. (Hereinafter: nuclear export.)

(2) The nuclear materials, installations, apparatus, expertise, and specific non-nuclear materials falling under the application of this decree are defined by the Appendix attached to this decree.

(3) For the purpose of applying this decree, countries possessing nuclear weapons are those that have manufactured and detonated nuclear explosive devices as of 1 January 1967.

(4) For the purpose of applying this decree, exporting firms are those that manufacture, prepare, maintain, or otherwise dispose of nuclear materials, installations, apparatus, expertise, and specific non-nuclear materials falling under the specifications of this decree. However, if nuclear export takes place as a part of a shipping or entrepreneurial agreement between a firm authorized to participate in foreign trade and a domestic economic unit, then the exporting firm is the one which is authorized to participate in foreign trade. (See Section 1, Paragraph 1 of Decree No 32/1967, dated 23 September 1967.)

Section 2

(1) Nuclear export may only take place if the responsible organ of the importing country provides written guarantee obliging itself in connection with the imported items, as well as nuclear material created from or derived from the use of the imported items,

a) not to use the above items for the manufacturing of nuclear weapons or other nuclear explosive devices;

b) to submit the above items for the duration of their existence to the safeguards defined in the founding document of the International Atomic Agency;

c) to place the above items under physical protection in order to prevent illegal access and use, in such a manner that the degree of protection be no less effective than that recommended by the International Atomic Agency;

d) not to re-export or turn over to a third party the above items without the written consent of the Hungarian exporting firm.

(2) The provisions of Paragraph (1) are considered to have been satisfied if the responsible state organ of the importing country refers to a bi- or multilateral international treaty or agreement--also signed by the Hungarian People's Republic--which includes the obligations enumerated in points a) to d) of Paragraph (1).

(3) It is the responsibility of the exporting firm to obtain the declaration prescribed in Paragraph (1).

Section 3

(1) In order to enter into or modify a foreign trade contract involving nuclear export, or to issue a consent referred to in point d) of Paragraph (1) in Section 2, the prior permission of the National Atomic Energy Committee is required.

(2) It is the responsibility of the exporting firm to obtain the above permission. In the procedures for obtaining permission, the provisions of Law I of 1981 (concerning the general rules of national administrative procedure) must be applied.

(3) The above permission does not relieve the exporting firm of its duty to obtain legally prescribed official permission to enter foreign trade contracts.

Section 4

The fulfillment of foreign trade contracts, or the transportation of items from the territory of the Hungarian People's Republic, is permissible only if a declaration containing an obligation in accordance with Section 2, Paragraph (1) is available, and if the government of the importing country agrees with the International Atomic Energy Committee to implement safeguards in accordance with point b) of Section 2, Paragraph (1).

Section 5

In the customs procedures involved in nuclear export, the provisions of this decree must be applied as special regulations prohibiting or restricting the transfer of specific commodities across national borders.

Section 6

During the preparation of international agreements involving nuclear export, the president of the National Atomic Energy Committee must be consulted.

Section 7

Nuclear export permits must be revoked if the importing country fails to adhere to its obligations enumerated in Section 2, Paragraph (1). Nuclear export to the same country must be suspended until the importing country satisfies the requirements relevant to its accepted obligations.

Section 8

This decree becomes effective on the day of its promulgation. However, its provisions must be applied to contracts involving nuclear export that were signed after 2 May 1985 and have not yet been completed.

Gyorgy Lazar
propriu manu
President of the Council of Ministers

APPENDIX to the Council of Ministers' Decree No 2/1986 (19 January 1986).

The nuclear materials, installations, apparatus, expertise, and specific non-nuclear materials coming under the provisions of this decree.

In applying the provisions of the decree

(1) NUCLEAR MATERIALS are: lean, natural, and enriched uranium, including the isotope U-233, plutonium, thorium, and any other material that contains one or more of the above in the form of metal, alloy, mix, or concentrate in such quantities as to exceed the amount (received by one country in the period of 12 months) described in point a), excluding the materials listed in point b):

a) enriched uranium, including its
isotope U-233, plutonium.....0.05 effective kilograms
natural uranium.....500.00 kilograms lean uranium
.....1,000.00 kilograms thorium
.....1,000.00 kilograms

Lean uranium is a substance in which the concentration of the isotope U-233 is lower than in natural uranium (0.71 percent).

The term EFFECTIVE KILOGRAM is defined in point 5, Appendix 1 of Decree 1/1971 (14 July) issued by the National Technical Development Committee concerning the registry of nuclear materials.

b) Plutonium in which the isotope plutonium-238 is present in concentrations higher than 80 percent. Uranium and plutonium, when utilized in quantities of a gram or less as a sensing element in instrumentation.

Uranium or thorium in lean and natural form, which the responsible state organ of the importing country guarantees to be used for non-nuclear purposes (e.g. the manufacturing of alloys and ceramics), as a result of which it becomes practically impossible to regenerate the nuclear materials.

(2) INSTALLATIONS and APPARATUS are: any installations and apparatus designed for the manufacturing, re-processing, or utilizing of nuclear and special non-nuclear materials, including:

(2.1) Atomic reactors, which can be operated so that a permanent, controlled, self-perpetuating chain-reaction comes into existence; excluding zero-producing reactors. Zero-producing reactors are those in which the maximum yearly rate of plutonium production is predicted to be below 100 grams.

(2.2) Reactor pressure vessels: metallic containers, either as complete units or prefabricated main components, designed and manufactured specifically to accommodate the active zone of an atomic reactor outlined in point (2.1), and in size suitable for the operational pressure of the primary coolant.

(2.3) Equipment for loading and unloading reactor fuels: manipulative equipment, designed and manufactured for the purpose of loading or unloading fuels into and from atomic reactors described in (2.1), either operable while the reactor is in operation, or assuring such positioning and fit as to make possible the loading or unloading of complex materials while the reactor is down, such as when the fuel is not directly visible or accessible.

(2.4) Reactor-controlling rods: rods designed and manufactured for the purpose of controlling the speed of reaction in atomic reactors described in (2.1).

(2.5) Pressure-resistant tubes for reactors: tubes designed and manufactured for the purpose of containing fuels and primary coolants at pressure levels of 50 atmospheres and above, in atomic reactors described in (2.1).

(2.6) Zirconium tubes: tubes or bundles of tubes made of zirconium or its alloys, in excess of 500 kilograms a year, designed or manufactured for use in atomic reactors described in (2.1) and containing hafnium and zirconium in weight proportions not exceeding 1:500.

(2.7) Primary coolant pumps: pumps designed or manufactured for the purpose of circulating liquefied metal as coolant in the atomic reactors as described in (2.1).

(2.8) Plants and equipment designed or manufactured for the purpose of reprocessing irradiated fuels.

(2.9) Plants for the manufacture of fuels.

(2.10) Equipment (excluding analytical instrumentation) designed or manufactured for the purpose of separating uranium isotopes, or equipment operating on principles that make them suitable for such operation.

(2.11) Plants or equipment specifically designed or manufactured for the purpose of producing heavy water, deuterium, or deuterium mixtures.

(3) EXPERTISE is: technological data, transmitted in the form of material, equipment sample, or the training of experts, which could be used for designing, manufacturing, and operating installations described in (2.9) (2.10) or (2.11), excluding those data which are accessible to anyone in books or journals.

(4) Special non-nuclear materials:

(4.1) Deuterium and heavy water:

Deuterium or any deuterium mixture in which the proportion of deuterium and hydrogen is greater then 1:5000, suitable for use in atomic reactors described in (2.1); if the quantity of deuterium atoms received by any country within any 12-month period is greater than 200 kilograms.

(4.2) Graphite of nuclear purity:

Graphite purer than 0.005 percent of boric value and having a specific gravity in excess of 1.5 grams/cubic centimeters; if the quantity received by any country within any 12-month period is greater than 30 tons.

12588
CSO: 5100/3042

YUGOSLAVIA

NEED FOR NUCLEAR POWER PLANTS QUESTIONED; DATA ON ENERGY NEEDS

Belgrade EKONOMSKA POLITIKA in Serbo-Croatian 2 Jun 86 pp 26-28

[Article by Dr Milan Djuric, Belgrade: "Nuclear Power Plants Without Foundation"]

[Text] The making of premature decisions and commitment to the urgent construction of nuclear power plants are based on the long-range development strategy of Yugoslavia's fuel and power industry, which is a part of the long-range economic stabilization program. It should be emphasized that that strategy was adopted as part of the package of the long-range economic stabilization program, but it did not respect economic principles of the country's economic development, nor the commitment to the effect that in development strategy there must be insistence upon maximum utilization of domestic resources and our own technology. This is best shown by the figures on the trend of the pattern of electric power production over the period 1986-2020 which the strategy is based on:

Indicator	1985	1990	1995	2000	2010	2020
Coal	44.2-45.5	48.0-50.7	47.1-53.5	45.0-52.4	57.0-46.2	40.9-29.9
Water power, %	42.7-41.4	42.1-39.8	40.2-35.0	37.6-31.2	25.1-19.8	17.3-13.3
Nuclear power, %	5.2- 5.1	4.1- 3.9	8.0- 7.3	12.6-12.4	14.0-30.2	38.0-53.1
Other, %	7.9- 8.0	5.8- 5.6	4.7- 4.2	4.8- 4.0	3.9- 3.8	3.8- 3.7
Total, %	100.0	100.0	100.0	100.0	100.0	100.0

The orientation toward intensive growth of the share of nuclear power plants in generating electric power would be pursued by following this schedule for putting nuclear power plants on line:

Version I		Version II	
1992-1010	6 900-MW plants	1992-2010	16 900-MW plants
2010-2020	17 900-MW plants	2010-2020	25 900-MW plants
Total capacity	20,700 MW	Total capacity	36,900 MW

The strategy foresees that one or two nuclear plants should go under construction by 1985, three or four in the period 1985-1990, and between five and nine nuclear plants in the period 1990-1996. If a nuclear power plant program is to be carried out according to this conception, Yugoslavia would have to provide foreign exchange over the period 1985-2020 amounting to $57.5 billion in the first version and $102.5 billion according to the second, assuming a cost of $2.5 billion per plant. There is no point even talking about what this additional debt would mean to our country when we are unable to pay off the present debt of $20 billion.

Before we examine whether we need to produce so much electric power at all, since this is obviously a "overinflated" estimate of the country's future electric power needs, one which was arrived at by applying an economically unreliable method of estimating the growth of consumption on the basis of the correlation coefficient of the interdependence between the growth of the social product and electric power consumption in the context of the economic crisis and the immense depreciation of the value of the domestic currency and an unrealistic indication of the value of the country's social product, we need to emphasize that investments in nuclear power plant construction are between 20 and 30 percent higher per unit generating capacity than hydroplants and 60-70 percent higher than coal-fired thermal plants (figures of the International Bank for Reconstruction and Development in Washington), which is certainly not a fact to be neglected.

The Amount of Power

The extent to which the entire strategy for long-range development of the electric power industry has been realistically postulated will be shown by a comparative analysis of the figures on the growth of production of electric power as set forth in the strategy and the figures established by the method of the declining growth trend and the method of the economic efficiency of utilization of electric power (the input is the consumption of electric power and the output is the national income per kilowatt-hour). According to the strategy for the long-range development of the fuel and power industry, production, that is, gross consumption of electric power, in Yugoslavia, ought to range as follows:

Year	Billions of kwh	Year	Billions of kwh
1985	72.7- 74.8	2000	146.4-176.5
1990	9? 7- 98.1	2010	223.2-282.5
1995	9-134.1	2020	330.2-425.7

The logic of the method of the declining growth trend of electric power consumption is based on the fact that development of the electrification of settlements, households, and the economy in the period from the country's low level of development to a level of high economic development requires a steady absolute increase year after year in the volume of electric power consumption, which is steadily declining in relative terms. Our country provides the best illustration of that in the following figures:

Average Annual Growth Rate of Electric Power, in percentage

Indicator	1950-1960	1960-1965	1965-1970	1970-1975	1975-1980	1980-1985
Total consumption	12.8	12.5	10.6	9.8	7.3	4.6
Industry	12.6	10.5	8.5	8.3	7.2	4.5
Household	17.2	17.8	16.1	11.3	8.5	5.3

The estimates were made on the basis of figures in the statistical yearbooks of JUGEL.

If we follow the pattern of the declining growth trend of electric power consumption that follows from the relationships among the economic trends of the physical volume of industrial output, the real standard of living, the degree of the country's electrification, the ever greater application of automatic control, electronics, and telemechanics in production processes, the rise in the level of efficiency in electric power consumption and the trend toward reduced use of electric power for heating and in metallurgy and the heavy chemical industry, we arrive at the position that the further growth of electric power consumption over the period 1985-2020 should follow an average annual growth rate lower than occurred in the period 1980-1985. Estimates based on the declining growth trend of electric power consumption show that the volume of electric power production in Yugoslavia would be considerably lower, as is evident from the figures below:

Year	According to Declining Trend From 4.5% to 3%, billions of kwh	Difference in Estimate of Output Between Strategy and Declining Growth Trend, billions of kwh
1985	72.7	--
1990	90.6	2.1 to 7.5
1995	110.2	6.7 to 23.9
2000	130.9	15.5 to 45.6
2010	151.8	71.4 to 130.7
2020	176.0	154.2 to 249.7

The differences that exist in the volume of future needs for electric power production between the figures set down in the strategy for long-range development of Yugoslavia's fuel and power industry and the figures established by the method of the declining trend of consumption are so great as to suggest the need for reassessment and adjustment of the figures used by the Strategy for Long-Range Development of the Fuel and Power Industry. If it is found that the volume of the country's need for electric power has been overestimated, and there is good reason to think so, the need for construction of nuclear power plants would thereby be objectively called into question. This position is also suggested by the figures to the effect that the average annual growth of gross electric power consumption in certain West European countries over the period 1978-1983 was 2.3 percent in Austria, 1.7 percent in Belgium, 4.0 percent in France, 4.0 percent in Greece, 1.8 percent in Italy, and 1.5 percent in West Germany.

The realism of the estimate of the electric power output forecast in the Strategy of the Long-Range Development of the Fuel and Power Industry can be checked by applying the method of the economic efficiency of electric power utilization by means of the indicator of the national income per kilowatt-hour consumed. Using the available figures in the Statistical Yearbook of Yugoslavia published by the Federal Bureau of Statistics, in 1983 the following figures were achieved for per capita national income and electric power consumption and for the level of economic efficiency in electric power consumption:

Country	Per Capita National Income (U.S. dollars)	Per Capita Electric Power Consumption (kwh)	Economic Efficiency of Consumption (U.S. dollars/kwh)
Austria	9,602	4,578	2.09
France	7,624	4,543	1.68
Greece	2,878	2,243	1.28
Italy	5,035	2,891	1.74
West Germany	8,732	5,577	1.57
Spain	3,336	2,499	1.33
Great Britain	6,817	4,220	1.62
Yugoslavia 1980	2,376	2,487	0.98
Yugoslavia 1983	1,013	2,731	0.37

It is evident from the figures that our country has been achieving a very low level of economic efficiency in electric power consumption as a result of the low level of per capita national income. Because of the immense depreciation of the domestic currency against foreign currencies, the value of the national income expressed in U.S. dollars dropped appreciably between 1980 and 1983, although in real terms that kind of drop did not occur in the physical volume of output of the economy. It is obviously a question of the impact of the devaluation of the value of the domestic currency on the volume of the national income rather than a high drop in the volume of the per capita national income.

If we include in the calculation the indicator of the economic efficiency of electric power consumption achieved in 1980 as a more realistic parameter and apply it to the figures on electric power consumption stated in the Strategy, it turns out that Yugoslavia would have to have a per capita national income in the year 2000 between $7,900 and $10,000 U.S. and in the year 2020 between $11,500 and $15,000, which is an economic absurdity when we compare it to the per capita level of national income which the most advanced countries in the world have today. If we also take into account the influence of technological progress and the improved efficiency in electric power consumption imposed by the country's economic development, this would mean that for the volume of electric power consumption forecast in the Strategy our country would have to achieve a somewhat higher per capita level of national income than indicated above.

A comparative analysis of the figures on the estimate of the growth of the country's needs for electric power which are presented in the Strategy

unambiguously indicates that the needs for electric power have been unrealistically estimated, that is, the volume has been set at a higher figure than is realistically necessary, and the problem of meeting the exaggerated electric power demand imposed as a solution the need to build a large number of nuclear power plants over the period 1985-2020. Thus nuclear power plants were brought into Yugoslavia's electric power balance for the period 1985-2020 by the back door, while at the front door a drive was initiated to urgently undertake construction of nuclear power plants so as not to be late in the domestic industry's technological development in mastering nuclear technology and so as not to threaten stability in the country's supply of electric power. The "strong economic argument" presented was that credit terms and conditions are favorable for importing foreign nuclear technology and nuclear fuel, and emphasis was put on the readiness of foreign trading partners to take repayment for our country's loans in the form of commodities. In all of this we still do not know what export goods are referred to, at a time when our country has no such goods and is hardly able to furnish for export a modest volume of quality goods at prices which do not signify a loss in business operation.

Greater Efficiency in Consumption

To what extent the possibilities really exist for us to build electric power plants with sufficient capacity in good time to meet the country's needs for electric power from our own energy resources and with our own technology is shown by the figures to the effect that today our country possesses a river hydropower potential that would furnish an average annual output of 71 billion kwh (including small hydroplants) and coal reserves of 22 billion tons, in which lignite's share is about 20 billion tons. According to the statistical data, about 40 percent of the available hydropower potential is being utilized today, while the West European countries are utilizing 85-90 percent, and we are just at the beginning of using coal to generate electric power. All of this indicates that there are real possibilities over the next 30 to 50 years of our country meeting all of its growing demand for electric power from its own sources, while at the same time appropriate measures would be taken to increase efficiency in electric power use. The following measures should be singled out as indispensable to favorably influencing a reduction in the growth trend of total electric power consumption:

i. technical reconstruction in the technology of electric power use in industry, agriculture, and transportation;

ii. transition to installation of more up-to-date systems of regulation and application, electronic instead of mechanical thermostats and other up-to-date technical designs in apparatus and equipment for refrigerating and preserving foodstuffs, in household appliances, as well as in industrial processes;

iii. adoption of the criterion of the economic efficiency of electric power utilization (input power, output national income) when investment decisions are being made on construction of industrial projects;

iv. a restructuring of power consumption by those consumers who can effectively and inexpensively meet their need for heat with greater use of solid, gaseous, and other forms of energy instead of using electric power;

v. a reorientation of households to meet their energy needs for heating purposes to a greater extent by using coal briquettes, gas, solar energy, and biomass, especially in rural households;

vi. through the use of rate incentives, a rate schedule system, and devices for control and management of daily consumption by energy-flexible consumers.

These and other technical measures which help to make electric power consumption more efficient should be carried out in an organized way with the full participation of government agencies, economic chambers, and organizations of associated labor, and with less of the amateurishness of relying on the recommendations of sociopolitical organizations. If we change what has been our practice up to now, if we restrict the influence of the political monopoly in making decisions on organization of the electric power industry and eliminate the influence of the narrow-minded technicist approach in solving the economic problems of development and the business operation of electric power organizations, the need to build nuclear power plants and other power plants based on imported technology and imported fuel will be reduced all the more.

7045
CSO: 5100/3044

ARGENTINA

CNEA'S NUCLEAR LICENSING COMMISSION CHAIRMAN ON SAFETY ISSUE

Cordoba LA VOZ DEL INTERIOR in Spanish 22 May 86 p 9

[Interview with Dr Dan Beninson, chairman of CALIN (Advisory Commission for Licensing Nuclear Facilities)]

[Text] [Question] Do you know Argentina's record of serious nuclear accidents up to 1986?

[Answer] The only one that could be described as having nuclear characteristics was the 1986 Constituyentes accident, in which one person died. In all, the number of accidents during the more than 30 years of the Commission's existence has been very low, and all of them involved the operating personnel; in no case was the public affected.

That particular case was caused by a violation of a required precautionary procedure, which serves as reassurance that in case something does happen, there will be a way of avoiding damage. In order to maintain absolute safety, whenever work is being done inside a reactor that has been shut down, the water moderator is removed to keep it from being started. This emptying and refilling procedure takes several hours.

This accident happened rather late on a Friday; the operator did not follow the safety procedures, did not remove the water, assuming that nothing would happen, but he also made another mistake. He picked up a case, thinking it contained a neutron absorber, but it was actually uranium, and the result was a critical pulse lasting for a minute fraction of a second, from which he received a fatal dose of radiation.

[Question] The case of Los Gigantes is of great concern in Cordoba, and at times there is talk of contamination. What do you know about it?

[Answer] I do know something about that. There are no problems with radioactive materials there. The uranium that was in the ground earlier has now been removed, and what is left are other radioactive materials.

When the uranium was removed, our inspectors monitored the operation, and we received data that we passed on to the province, proving that there are

no problems there. Before we started, there was a potential problem, but we have made some changes, and I can assure you that everything has been worked out.

There are other types of discharges, and I have heard that there are some chemical problems. That is not my area of expertise, and I don't have any authority to do anything about it. But I do know that Cordoba has environmental regulations that must be complied with.

In the field of radiological risks, we have made them do some specific things. In any event, I have seen studies at the Commission and I expect that solutions have been implemented.

Effects of Chernobyl

[Question] What are the mid and long-term effects of the Chernobyl accident going to be?

[Answer] We still can't be absolutely sure, but based on the estimates, at distances of up to several tens of kilometers from the site of the accident, the radiation doses received by persons in those areas 6 hours after the accident had occurred may have been substantial.

It is highly probable that the health of those persons has been gravely affected. Of the two persons who died in the beginning, one was burned by steam and the other was killed by the collapse of part of the structure on top of him.

At this time the hematological syndrome of acute radiation illness is beginning to appear, and it will finally be learned how many deaths were caused by the Chernobyl accident.

If it is true that the evacuation began 36 hours after the accident, it is highly probable that some very grave effects will be seen. But that is quite a different matter from what happens at a distance, when radioactive materials are carried by air masses.

The highest levels measured in West Europe, in Scandinavia, are approximately 10 times what we saw in our air and rainfall, milk and green vegetables after the French detonations in Mururoa.

[Question] Does this mean that the effects of the Chernobyl accident are less important in Argentina?

[Answer] No, there will be no effects here. In the days of the old Mururoa experiments, we in the southern hemisphere never saw any materials injected into the troposphere of the northern hemisphere.

The effects will be seen in the northern hemisphere, but at very low levels. I am willing to bet that we are not going to see any effects in our hemisphere.

[Question] This event has created concern in towns near nuclear centers or plants; that is certainly true in Cordoba. What can you tell us about Argentina's safety system, compared to the one in the damaged Soviet plant?

[Answer] No facility has absolute safety. We do believe that the probability of an accident is very much lower here and we also believe that the local consequences would be much less severe.

The designs in the two cases are completely different. In our plants we have many more safety-related components, and in both Atucha and in Embalse we have a containment building, whose purpose is to contain radioactive materials in case a serious accident should occur in the reactor.

In any event, we could not have licensed a plant with the Chernobyl design.

[Question] Is that a decision made by Argentina's nuclear policy or is it determined by some international organization?

[Answer] International organizations can only recommend, but they can not decide things for different countries. That is a decision of the Argentine licensing authority, which is an independent branch of the CNEA [National Atomic Energy Commission].

There are also other aspects of radiological protection where we believe that our safety ambitions are a good deal higher--both for the operating personnel and for the public--than in Chernobyl and in some other parts of the world. Our philosophy is very close to the Scandinavians' thinking in this area.

[Question] Are there practicable alternatives to nuclear energy?

[Answer] In some countries I would say no, because there are no other resources and also because they already have such a large nuclear energy component that it would be impossible to replace it.

Over 80 percent of France's energy is of nuclear origin. Sweden has close to 60 percent, and that is not very easy to replace.

[Question] What about Argentina?

[Answer] It must be on the order of 15 percent. But the issue isn't just whether it can be replaced or not. The other aspect in Argentina's case--and in the French case as well--is that so far nuclear energy has been less expensive. And I don't believe that from the standpoint of safety it compares unfavorably with other energy sources.

There are accidents in many places, local catastrophes--Chernobyl was one such instance--in other sources as well. In hydroelectric power, dams have collapsed. In Italy and Switzerland there have been accidents in which up to 2,000 people were killed and entire towns were wiped out.

[Question] Despite the risks and the safety levels in Argentina, do you feel we should continue to push the nuclear plan?

[Answer] I think so. I am convinced that at some point in time it will be nuclear energy or nothing, especially after the first decade of the next century.

There are also other reasons besides energy production--the use of byproducts, radioisotope applications, irradiation of foods, etc.

Another indirect byproduct of nuclear energy is a great surge in technological development in a variety of fields. We have already seen its effects in Argentina.

[Question] What about the strategic area?

[Answer] If by that you mean nuclear weapons, let me tell you that Argentina has never worked in that area, and I don't believe it would be sensible to do so; it would mean creating an imbalance in the continent, a disaster in every sense.

[Question] How do international organizations view our potential for producing nuclear weapons?

[Answer] In spite of many things you may hear said, I believe they have confidence in us. Moreover, I feel that with the great powers' intelligence services, it would be inconceivable if they didn't know exactly where we stand in this field.

[Question] Getting back to Chernobyl, could the Russian accident create a need for safety recommendations that are more than just recommendations? That is, might they come to have a greater effect?

[Answer] I don't think an international recommendation can have any effect other than that of a suggestion. Moreover, safety isn't a problem of legal provisions, but a technical problem.

It would be hard to have detailed technical safety designs for one particular facility generated on an international level. It would be impossible; what we might have are recommendations creating a philosophy, a level of ambition. But how to do that is so specific to the facility and the plant's design that I think it would be very hard to put it into practice.

7679
CSO: 5100/2082

BRAZIL

CTA HEAD ON DUAL USE OF NUCLEAR TECHNOLOGY

Brasilia CORREIO BRASILIENSE In Portuguese 25 Apr 86 p 6

[Text] Sao Jose dos Campos--The director of the Ministry of Aviation's Aerospace Technical Center (CTA), Major General Hugo de Oliveira Piva, acknowledged yesterday that although there had been no "political decision by the administration" to manufacture an atomic bomb, Brazil is preparing itself to use nuclear energy for military purposes.

Piva explained to a group of foreign and Brazilian journalists that Brazil while working on the peaceful applications of nuclear energy, is also developing the capability to use it in war-related activities. One cannot therefore, disassociate one from the other.

"If we make a knife, we can use it both for cutting an orange and for killing someone", Piva told the jorunalists, who had traveled from Brasilia to Sao Jose dos Campos at the invitation of the Ministry of Aviation to tour the Embraer and CTA facilities. "Once we have mastered the technology of the atom," Piva added, "it can be used for both good and evil."

Speaking cautiously, the CTA head confirmed that nuclear research is going on in one of the departments under his command--the Institute for Advanced Studies. He explained, however, that none of those studies is aimed at non peaceful applications--that is, the manufacture of nuclear weapons.

Responding to questions from the journalists, Gen Piva also acknowledged that information he has obtained indicates that "Argentina must be more advanced than Brazil" in studies related to nuclear energy. "That does not concern us, because we do not see Argentina as an enemy," Piva stated. "On the contrary--we have even signed cooperative agreements in this field."

To convey an idea of the type of research being done at CTA, Gen Piva said that the work done by his researchers will only "find practical use" in the middle of the year 2000, or 15 years from now.

Ambition

The "most ambitious" CTA project is not nuclear, but space-related. It involves the development of a satellite launch vehicle, scheduled to be

ready in 1989 for launching from the Alcantara Base in Maranhao. Gen Piva speaks with special enthusiasm of the SLV, as it is called by technicians, which is the apple of his eye.

When it goes into space in 1989, the VLS will take with it the first fully Brazilian-made satellite. Therefore, the launch pad and the "land segment"--the equipment responsible for receiving the signals transmitted by the satellite--are already being readied.

"It will be a complete space mission," Piva boasted. The CTA, he said, is very interested in exchanging information with friendly nations.

12830/9190
CSO: 5100/2074

BRAZIL

IMPACT OF CHERNOBYL ON FUTURE PLANT CONSTRUCTION DISCUSSED

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 17 May 86 p 3

[Text] President Jose Sarney made a wise decision concerning the Brazilian nuclear program: He will not begin construction, during his administration, on any new nuclear power plant beyond those already scheduled, because of the Chernobyl incident and because the country will not need that source of energy to supplement its generating capacity. The decision was based on the opinion of a commission that studied the risks of the nuclear power programs. Actually, that opinion contradicts what had been proposed by another commission which evaluated the utilization of nuclear energy to complement energy produced by hydroelectric means. The earlier commission had suggested, not very convincingly, that a fourth plant be built after Angra I (now completed) and Angras II and III (partially under construction, with the equipment already purchased.) It seems that the president is choosing now, in light of the Chernobyl accident, to suspend the program at its present phase so as not to increase the risks that already exist—which we can do without—of the future existence of three power plants.

Obviously, all this should be viewed less emotionally. Just because there was an accident with the Soviet reactor does not mean that something similar will happen in Brazil. A few days ago, however, a committee of scientists from the Brazilian Nuclear Energy Association, ABEN, concluded that "to be perfectly truthful, we must also recognize that the nuclear power business still has some risks. The possibility of a serious accident at Angra dos Reis is extremely small, but it exists...An honest expert would acknowledge that there are doubts as to the exact quantification of the magnitude of that risk." That is to say, the more nuclear plants there are, the greater the risks.

What did the president decide to do? Using common sense, he ordered that the risks be reduced, believing this to be preferable to adopting stricter safety measures that would make the projects more expensive and still not eliminate the threat entirely. Mr. Sarney must have been motivated by the other, deeper, reasons that we have been insistent in citing in our editorials; i.e., Brazil does not need this nuclear complement to its electricity-generating systems. It has coal, which is unsalable; oil, the reserves of which grow daily; and gas, which it has not even begun to use. (Actually Brazil is only now discovering that gas, whether foreign

or domestic, is a rich and clean source of energy. This is "something new" to Petrobras technicians...)

The first commission that studied the nuclear program has suggested, with an eye to political considerations, that an additional nuclear power plant be built. It did so on the completely false assumption that Brazil's hydroelectric potential, estimated at 200 million kilowatts, would be exhausted in the early years of the next century. Now that Eletrobras has been looking into this potential more thoroughly, it is finding, to its surprise, that new discoveries are continually broadening that horizon. So we have enough energy in the rivers to meet the country's needs until the end of this century and for at least the first few decades of the next one. As for the thermal supplement, which is technically advisable and necessary, it could be furnished by plants fueled by gas, oil, or coal--preferably by gas because it is cleaner and more economical.

Under these circumstances, the president acted properly when he rejected the proposal to build an additional thermonuclear unit. The accident at Chernobyl served, shall we say, to bring common sense to the fore in government decisions. It simply showed that in the Brazilian energy context, nuclear power plants are economically, technically and ecologically unnecessary--at least during the next 10 years, when it is likely that new techniques will be developed abroad. We only regret that we cannot cancel the contracts for Angra II and III for which the equipment is already being delivered. We are going to pay more for them and run greater risks. This is, at the very least, a double insanity.

12830/9190
CSO: 5100/2074

BRAZIL

ANGRA I MAY REMAIN OUT OF OPERATION ANOTHER MONTH

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 13 May 86 p 44

[Text] The Angra I nuclear powerplant, which has been out of operation since 2 January, will remain shut down for at least another month. It is currently undergoing an ILRT (integrated leak rate test) to determine whether there are any leaks in the containment vessel. Engineer Pedro Figueiredo, head of the Angra I plant, announced that the safety test, the first of its kind to be performed at the plant, will be completed within a week.

The ILRT test consists of injecting 36 million liters of dry air into the containment vessel and then taking measurements to determine whether any is leaking. The maximum permissible leak rate is 150 milliliters per day--the equivalent of half a can of soda pop. According to Pedro Figueiredo, the test must be conducted three times every 10 years, but although the plant has been operating for only 1 year, the technicians decided to conduct it now "to take advantage of the long shutdown."

According to the plant's chief engineer, the prolonged shutdown has nothing to do with the campaign by the inhabitants of Angra dos Reis, who have been demanding compliance with safety standards and the adoption of a plan to evacuate the city's 80,000 residents in case of an accident. That movement came back to life at the end of last year and just happened to coincide with the plan to shut down the plant to examine its equipment, the guarantee period on which was coming to end.

The chief engineer says that work during the 5-month shutdown has included replacement of the condenser, which has 48,000 tubes, and inspection of the turbine (the guarantee on which expired on 20 February) and the steam generator (the guarantee on which will run for 2 more years). According to Pedro Figueiredo, the guarantee on "the bulk of the equipment" expired in November of last year.

Pedro Figueiredo explained that the current leak test was nothing out of the ordinary, but he admitted that the inhabitants of Angra dos Reis were fearful and said that the media were giving unnecessary prominence to this kind of operation. There are 170 points at which radioactive air can escape.

Pedro Figueiredo said he regarded as "natural" the series of demonstrations that have been occurring in Angra dos Reis to protest the plant's operation and remarked that although a "zero risk of accident" does not exist, an accident serious enough to make rapid evacuation of Angra's population necessary would require a series of coincidences, among them "a leak followed by an earthquake and a Boeing falling on the reactor."

Aureliano Rejects Protest

The protests by ecologists and pacifists against Brazil's nuclear powerplants at the Angra dos Reis complex in Rio de Janeiro were described by Minister of Mines and Energy Aureliano Chaves as "emotional demonstrations." He said that despite the small amounts being invested in that sector, the Federal Government insists on continued exploitation of nuclear energy with a view to meeting future requirements.

In the minister's opinion, the protests "must be taken into account, because they reflect the position of one sector of Brazilian society, but they cannot prevent Brazilian nuclear research." And he argued that "failing to recognize nuclear energy as a necessity means failing to recognize reality itself. The world is not safe from catastrophe."

11798
CSO: 5100/2077

BRAZIL

SARNEY GOVERNMENT NOT TO BEGIN CONSTRUCTION OF NEW PLANTS

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 16 May 86 p 42

[Text] Brasilia--President Jose Sarney's administration will not begin construction of new nuclear powerplants in addition to Angra II and III (which are already under construction), its purpose being to avoid the risk of an accident like the one that occurred at the Chernobyl plant in the Soviet Union. That decision was announced to Minister of Mines and Energy Aureliano Chaves yesterday by President Sarney following recommendations by the special commission set up to analyze the impact of the Chernobyl accident on the Brazilian nuclear program. According to Aureliano, the decision does not mean that the Brazilian Government is abandoning nuclear energy. In his opinion, "it is necessary." He recalled that the time and money available to the current administration are sufficient only for continuing the programs now in progress.

Despite its conclusion that the Angra I plant meets the criteria for maximum safety as established by the IAEA, the commission proposed that a national commission on radiation protection and nuclear safety be established within the Office of the President of the Republic to set standards for inspection and licensing operations by the existing organizations.

It also recommended participation by civilian society in SIPRON (Protective System for the Brazilian Nuclear Program) and COPRON (Coordinating Commission for Protecting the Brazilian Nuclear Program); an updating--"systematic and continuous"--of the Angra I External Emergency Plan; and support for the Angra dos Reis municipal government in adopting safety measures for the inhabitants.

The evaluation by the commission was requested by President Sarney just after the accident in the Soviet Union. Those participating were the secretary general of the Ministry of Mines and Energy, Paulo Richer; the chairman of Nuclebras, Licinio Marcelo Seabra; the chairman of ELETROBRAS [Brazilian Electric Power Companies, Inc.], Mario Penna Bhering; the chairman of Furnas, Joao Camilo Pena; the chairman of the CNEN [National Nuclear Energy Commission], Rex Nazare Alves; the rector of Sao Paulo University, Jose Goldemberg; a representative of the Ministry of Science and Technology, Jacques Danon; the chairman of the CPFL, Rogerio de Cerqueira Leite; the chef de cabinet of the Ministry of Interior, Deusdedit Aquino; the mayor of Angra

dos Reis, Jose Reseck; the chairman of the Evacuation Committee of the Ministry of Interior, Tito Gobato; Luiz Pinguelli Rosa of the Federal University of Rio de Janeiro; and Colonel Walmar Villar of the National Security Council.

11798
CSO: 5100/2077

BRAZIL

NUCLEBRAS HEAD GUARANTEES NO DANGER EXISTS AT ANGRA

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 21 May 86 p 21

[Text] Brasilia--Testifying yesterday before the Senate CPI [Commission for Congressional Investigations] on state-owned enterprises, the chairman of Nuclebras, Licinio Seabra, said that the contention that construction of the Angra II and Angra III nuclear powerplants should be halted to avoid accidents and protect the neighboring population might block the entire Brazilian Nuclear Program, the reason being that if it is stipulated that plants can only be built in deserted areas, there will be practically no place to set them up.

Seabra said that choosing the site of a nuclear powerplant is a controversial issue, but he claimed that a unit built according to the technological pattern adopted for Angra II and III has a high level of reliability and that the chance of a serious accident is quite small. He also pointed out that the population living within a radius of 30 kilometers of Angra is not very large. According to the mayor of that municipality, there are 100,000 inhabitants in the entire city of Angra dos Reis.

In the opinion of the chairman of Nuclebras, it will also be necessary for the government to decide in good time--that is, by 1989--to build Brazil's fourth nuclear powerplant, which will be its third under the Brazilian-West German agreement. That plant must be built in order to retain the technological base and the teams employed in engineering and in the fabrication of heavy components. He feels that without the fourth plant, that competence will be lost.

Senator Cesar Cals (Social Democratic Party, Ceara), who is chairman of the CPI, suggested that the unit be built in Ceara or Rio Grande do Norte, "at the end of the Northeast transmission system," since doing so would increase the reliability of the entire system and make it unnecessary to transmit large blocks of power over long distances from Paulo Afonso or Tucurui.

Seabra also said that there were no comparable alternatives to nuclear energy and that the world would not be able to survive without those reactors. He therefore believes that new construction orders will be placed in the near future, and when that happens, the NUCLEP [Nuclebras Heavy Equipment, Inc.]

plant, which is one of the most modern in the world, will be in a good position to win out in international competition as far as prices and terms are concerned.

He said that Nuclebras was "bankrupt" because of its precarious financial situation and that its situation was due in large part to the enterprise's policy since 1980 of attracting foreign funds from West German banks.

The result of that high level of debt and the irregularity with which funds are provided has been delays in construction, accompanied by increasing costs. The Angra II and III plants, for example, whose construction timetables have stretched out to 16 years, are having to cope with inflationary and financial costs amounting to more than 200 percent of their direct costs, whereas the maximum should have been 60 percent in 6 years. Seabra estimates that the financial costs involved in the Angra plants will total $2 billion, provided there are no more delays, and that this situation is also hampering the Brazilianization program itself, since domestic firms have changed their minds and are abandoning the field because of the lack of orders.

11798
CSO: 5100/2077

BRIEFS

ANGRA II FUNDING NEEDS--Belo Horizonte--Licinio Marcelo Seabra, chairman of Nuclebras, announced yesterday that the Angra II nuclear plant will need $100 million this year to avoid new construction delays. Licinio Seabra commented: "Without those funds, construction, which is scheduled for completion in 1992, will be delayed by from 1 to 1.5 years." The Nuclebras chairman recalled that a delay in construction might cause a bottleneck in the energy sector in 1992, since electrictiy demand is tending to rise at a fast rate and the Angra plant would help balance that situation. According to Licinio Seabra, $2 billion have already been invested in the plant, and over $800 million will be needed before construction is complete in 1992. Minister of Mines and Energy Aureliano Chaves met yesterday with Joao Camilo Pena, chairman of Furnas Electric Powerplants, Inc., and Raimundo Pereira Mascarenhas, chairman of the Vale do Rio Doce Company. With the chairman of Furnas, the minister discussed reactivation of the Angra I nuclear powerplant, and with Raimundo Pereira Mascarenhas, he took stock of the world market and analyzed the company's volume of exports for 1986, which should total 78 million metric tons. [Text] [Rio de Janeiro O GLOBO in Portuguese 28 Apr 86 p 20] 11798

COMPUTER SAFEGUARD SYSTEM--The Special Secretariat of Informatics (SEI) may delay installation at the Angra I nuclear powerplant of a computerized system intended to reduce the risk of accidents. The system was scheduled for completion in 1987. According to Sergio Guimaraes, superintendent of nuclear generation at Furnas, and Pedro Figueiredo, head of the plant, the state-owned enterprise is attempting to obtain the SEI's authorization to import two large and highly reliable computers with 6 megabytes of memory. They explained that Furnas' import application conflicts with the SEI's interest in developing domestic computers. According to the two experts, Furnas cannot wait for the project to be developed domestically, since that would take too long. The entirely domestic project is now ready. It was developed by the COPPE [Coordination Board of Postgraduate Programs in Engineering] at the UFRJ [Federal University of Rio de Janeiro] under an agreement with Furnas. This system provides a visual display of information concerning everything that is happening in the plant, shows immediately where a problem is occurring, and analyzes it quickly. Use of a computerized system in powerplants, which has been adopted in the United States, France, and the FRG, was recommended following the accident at Three Mile Island in 1979. [By Ramona Ordonez] [Text] [Rio de Janeiro O GLOBO in Portuguese 11 May 86 p 31] 11798

NUCLEAR TECHNICIANS' DISMISSALS--If the government approves one of the recommendations made by the Commission for Evaluation of the Nuclear Program, which has suggested eliminating three of the five Nuclebras subsidiaries--NUCLEP [Nuclebras Heavy Equipment, Inc.], NUCLEI [Nuclebras Isotope Enrichment, Inc.], and NUCLAM [Nuclebras Mining Assistance, Inc.]--to improve the system's efficiency, the 1,045 employees of those enterprises will have to be dismissed because the holding company is already operating with 30-percent idle capacity and cannot absorb more manpower. That information comes from sources in the government. The chairman of Nuclebras, Licinio Seabra, declined to comment on the situation. In all, the Nuclebras Group employs 5,770 people: 3,254 work for the holding company, and 2,516 are employed by the five subsidiaries. The evaluation commission has also recommended privatizing the fourth subsidiary--NUCLEMON [Nuclebras Monazite and Associated Elements, Ltd.], which is concerned with rare earths and monazite-bearing sands--and transferring NUCLEN [Nuclebras Engineering, Inc.], the group's fifth subsidiary, to ELETROBRAS [Brazilian Electric Power Companies, Inc.]. Those changes might increase the number of dismissals. [Text] [Rio de Janeiro O GLOBO in Portuguese 23 Apr 86 p 22] 11798

CSO: 5100/2077

EGYPT

BRIEFS

CAIRO UNIVERSITY NUCLEAR MATERIALS--Cairo, 16 Jun--Cairo University Rector Dr Hilmi Nammar issued a decision today providing that all nuclear radioactive sources at the faculty of sciences, Cairo University, be handed over to the Nuclear Energy Authority to be deposited in places especially designed for them. These sources will be kept by the said authority until the faculty of sciences prepares for them places with such specifications as required by the energy authority. The faculty will have, by then, procured a license from the Health Ministry for using these sources. Dr Mannar said that his decision was taken in accordance with the outcome of the technical reports made by the specialised committees of the Energy Authority and the Health Ministry on the nuclear radioactive source in the faculty of sciences. [Text] [Cairo MENA in English 1050 GMT 16 Jun 86 NC] /9274

CSO: 5100/4613

INDIA

DETAILS OF FAST BREEDER REACTOR DISCUSSED, REPORTED

Kalpakkam Director Interviewed

Calcutta THE TELEGRAPH in English 14 May 86 p 6

[Interview with Dr C.V. Sundaram by Pathik Guha]

[Text]

Q: India's Fast Breeder Test Reactor (FBTR) is said to have been built by copying the French plant at Rapsodie. Even so, you claim credit for a number of modifications in design as well as functioning. What are they?

A: Yes, our FBTR is based on the design of the original Rapsodie reactor in France. But that plant did not provide for any power generation. Since we went ahead with our FBTR keeping in mind power generation as the ultimate goal, we had to arrange for steam generation. Our FBTR has the capacity to produce 13 MW of electrical energy which is equivalent to 40 MW of heat energy.

Besides, the Rapsodie reactor used mixed oxides of uranium and plutonium as fuel whereas we are using mixed carbides of those two elements. As we progressed with the design of FBTR we had to think of an alternative as we did not have the facility to enrich uranium as the French had for getting their uranium oxide. We did not want to import enriched uranium oxide either. That is how we arrived at the mixed carbide fuel which is a mixture of 70 per cent of plutonium carbide and 30 per cent uranium carbide.

Q: The cost of the FBTR is stated to be Rs 68.72 crores, excluding the cost of fuel and other core assemblies. Does the figure include the expenditure incurred on R&D also?

A: When we set up this Reactor Research Centre, our aim was not only to have a test reactor like this one, but also to set up a base for the absorption and assimilation of this technology. So we decided to build an R&D laboratory along with the FBTR. In fact, we wanted to set up not one but many laboratories for learning more about the chemistry of sodium, then material sciences and material management, fuel reprocessing and so on. The total investment is about Rs 79-80 crores towards the FBTR and another Rs 35 crores for creating those facilities.

Q: Since the FBTR has an import content of about 22 per cent, can we still call it indigenous?

A: There were some special materials we had to buy from outside, for example the special stainless steel required to fabricate the main reactor vessel, the intermediate heat exchanger and the sodium pumps. We also got the design drawings and the know-how for the fabrication of these components. These account for the import content of 22 per cent.

But our decision to fabricate all the major components ourselves has been very important in the sense that our experts gathered enough experience. A number of Indian companies were involved. The reactor vessel was fabricated by Bhel (Bharat Heavy Electricals Limited) in Hyderabad; the steam generators and intermediate heat exchangers were fabricated by Bhel, Tiruchy; the turbogenerator has been supplied by Bhel, Bhopal. And private companies like the Walchandnagar group have made the sodium pumps and also the control rod dry mechanisms.

So there has been a large participation by Indian industry—both public and private sector—in setting up our first FBTR. I would call it a predominantly indigenous effort.

Q: How much is a fast breeder reactor (FBR) likely to cost?

A: The 500-MW ones we will build?

Q: Yes.

A: Well, we prepared our design for FBRs in 1983. And as per cost calculations made then, 500-MW FBR was likely to cost around Rs 750 crores.

Q: How much did you have to pay for the blueprint you obtained from the French?

A: The amount that we had to pay the atomic energy agency of France and some French companies was Rs 4.65 crores. This, of course, includes our payments for the know-how and other design data. We had to pay another Rs 4.81 crores for getting raw materials from outside like stainless steel. Then there were manufactured components as well—like sodium pumps, grid plate, etc.—for which we had to pay Rs 4.94 crores.

Q: Which other countries in the world are at the moment experimenting or actually generating power through FBRs?

A: The largest FBR that has been established in the world is the Superphenix in France. It was commissioned last year. It has a capacity to produce 1,200 MW of electricity. It will start commercial power generation by the end of this year. Then there are breeder reactors of 600-MW capacity, there is one such plant in the USSR right now and it is supplying electricity. That country is planning to set up more breeder reactors of 800-MW capacity.

In the UK also, a prototype FBR with a capacity of 250 MW has been operating for the last few years. West Germany has also completed the construction of a 300-MW breeder reactor. The plant will be commissioned very shortly. Then again, countries like Japan and the US have very large programmes in breeder reactor technology.

Q: There was an accident at the Rapsodie plant in France. What actually went wrong?

A: It was a test reactor that had successfully operated for 15 long years—from 1967 to 1982. It provided the French with enough experience in breeder technology. There was a small leak in the outer jacket of the reactor vessel. They examined the leak and as the plant had already had a useful life of 15 years, they decided to shut it down. Even in the process of shutting it down, a number of interesting experiments were conducted. Which is why I think it cannot be described as an accident.

Q: What were these "interesting experiments?"

A: Those were with respect to the behaviour of the reactor in the event of the pumps failing. The experiments have demonstrated that the design is so safe that even with the failure of pumps, the reactor and power generation comes down very slowly.

Q: What are the possible accidents that could take place in an FBR?

A: The main source of trouble is usually sodium, because it can catch fire if it comes out in open air from the pipes. That is why in the primary side of the reactor—its main vessel—the pumps and other components, through which sodium flows, have been provided with double walls so that if there is a leak in the first wall, the molten sodium will be contained by the secondary pipes or vessels. So the threat of radioactivity due to a spillage of sodium is not there.

Q: What if the radioactivity comes out of the reactor vessel?

A: We have the containment building to keep everything in.

Q: But in your design of the prototype FBR, you have done away with the containment building.

A: No, that is not true. There is a containment building, but that was not designed for very high pressure.

Q: Aren't you taking a chance? In the case of a core meltdown, the temperature inside the reactor vessel will rise enormously.'

A: I should say the chances of such a situation arising are very remote.

Q: Why?

A: There is an in-built system in the reactor so that when there is a rise of temperature, the rate of reactivity of the core comes down which, in turn, brings down the core temperature. So, a reactor like this is inherently safe.

Q: Do you mean to say that there is no chance of any nuclear explosion in a FBR?

A: I think I have answered your question already. You must remember that the technology for explosive device is quite different. There, you have to enhance the rate of reactivity very fast. On the contrary, here the reactivity comes down automatically. Even if you fail to raise the rate of reactivity in a bomb, it will fizzle out.

Description of Reactor

Madras THE HINDU in English 14 May 86 p 19

[Text]

India's first fast breeder test reactor uses indigenously developed plutonium-uranium carbide as fuel, which is developed at the Bhabha Atomic Research Centre (BARC), Bombay. This eliminates the need for use of enriched uranium whose supply is governed by international safeguards and is the fast breeder reactor fuel elsewhere in the world.

The FBTR has a cylindrical stainless steel reactor vessel of 3.2m diameter and 8.7m height containing the fuel, blanket and reflector subassemblies supported on a grid plate. The vessel is protected internally by thermal and neutron shields. Primary sodium at 380°C enters the bottom of the vessel and after passing through the subassemblies gets heated to 515°C and leaves the vessel to the two primary loops.

The vessel is closed at the top by two rotating plugs, whose combined rotation enables the loading or unloading of subassemblies through a single loading channel. These plugs, made of steel and borated graphite serve as biological and thermal shielding. The lateral biological shielding is assured by concrete. A sealed containment building prevents dispersion of radioactive material in a hypothetical core disassembly accident.

The fuel pins are of 5.1mm outer diameter and there are 61 such pins in each fuel subassembly. The sodium flows in the interspace between the pins extracting the heat of fission.

Heat from sodium in each primary loop is transferred to sodium in the secondary loops through intermediate heat exchangers. Sodium in the secondary loops flows through steam generators to produce steam at 125 kg/sq.cm. pressure and 480°C temperature to run a specially designed steam turbine and generate electrical power.

The reactor is controlled by means of six control rods, containing enriched boron carbide, inserted into the core by control rod drive mechanisms from the top of the reactor vessel. The reactor is designed to have all negative temperature feedback coefficients, which means that if for any reason temperature of core increases, the chain reaction by itself subsides and the power reduces. Thus the reactor is extremely stable and does not need automatic power control instrumentation. An outline computer serves as a central data processing system. It is provided for data logging and for monitoring the responses of various reactor instrumentation.

The FBTR is similar in design to the French reactor Rapsodie. But, while the latter uses mixed plutonium oxide and highly enriched uranium oxide fuel, the FBTR is using a mixed carbide fuel of Indian design.

For Indian scientists, the commissioning of the FBTR was the culmination of some 13 years of persistent research and development of a technology mastered by only six other nations, namely the U.S., the Soviet Union, Japan, France, the U.K. and West Germany. — **PTI Science Service.**

/9317
CSO: 4150/0125

SAFETY PROBLEMS AT INDIAN NUCLEAR PLANTS DISCUSSED

Calcutta THE TELEGRAPH in English 1 Jun 86 p 7

[Article by Pathik Guha]

[Text]

All was quiet on India's nuclear horizon. When, on March 1, 1980 a disturbing PTI news item revealed a crack in the nation's hitherto satisfactory record of commercial nuclear power generation spanning over a decade. The news agency dispatch read: "One of the two nuclear power reactors at Tarapur recently suffered a mishap that could have resulted in a major nuclear disaster. Tarapur escaped the disaster as one of the power plants was fortunately not running when its primary coolant pipe started leaking a few days ago. If the pipe had leaked when the reactor was running, 'a core meltdown would be a distinct possibility, which would have made the Three Mile Island (Harrisburg) accident in the United States a minor affair in comparison,' informed sources told PTI. The department of atomic energy (DAE), which had hushed up the incident for over a week, today confirmed the leaks in the coolant pipe. The DAE, however, described the leaks as 'insignificant'."

The nuclear lobby in the country, as this dispatch indicates, tried its best to play down this incident, at what was then the country's sole atomic power station. At a seminar in Baroda on March 13, the chairman of the Atomic Energy Commission, Dr H.N. Sethna, said: "Since the automobile came into existence, it has killed more than 25 million people in the world. In India, we have among the highest rates of automobile accidents. In 1976, there were well over 1,00,000 road accidents in the country as a result of which nearly 14,000 people died. Should these awesome and tragic statistics lead us to abolish cars from our roads?"

He spoke too soon. Within hours of Dr Sethna's strong advocacy of India's need for nuclear power, as well as his insistence that atomic power was safer compared to other conventional sources of energy, occurred another accident at Tarapur. On March 14, as repairmen were busy plugging the "pinhole" crack described in the PTI news item, and engineers were removing the two-feet-long cracked tube in order to weld in a new one, contaminated water rushed out of the pipe when an "ice-plug" of liquid nitrogen failed to withstand the heavy pressure of water inside it.

The media woke up. A spate of investigative reports and "disclosures" followed, of things going wrong at the country's nuclear facilities. Examples:

- Radiation leak at Rajasthan atomic plant at Kota (October 26, 1981).
- Two children die of burns while collecting combustible scrap at the Nuclear Fuel Complex, in Hyderabad (March 7, 1982).
- Alarming radiation level at Tarapur (May 8, 1983).
- Engineer dies of gas leak at heavy water plant at Kota (October 25, 1984).

Press reports about the ill-fated Tarapur plant also periodically noted that it had broken several world records in the levels of radiation to which it exposed its workers, that it was counted as the most contaminated atomic power station of its type in the world and that the shortage of spare parts had created acute operational problems.

None of the developments are obviously comparable to the tragic mishap at the Chernobyl nuclear plant in the Soviet Union, as a result of which 19 persons are said to have died so far. At Chernobyl, as one magazine said, "Man's scientific genius fused disastrously with human error." Fortunately, India has been spared such a tragedy yet. Even the deaths mentioned earlier cannot be directly linked to inadvertent radioactive leakage. And our experience of 40 years of reactor operation—taking into account the operational life of the plants at Tarapur, Rana Pratap Sagar and Kalpakkam—has been just about satisfactory.

Among those who are impressed by this performance is the Prime Minister, Mr Rajiv Gandhi. Addressing a parliamentary consultative committee meeting a few days back, Mr Gandhi declared that there was no chance of a Chernobyl-type accident here. The Prime Minister's assurance simply echoed the feelings of our nuclear experts, who are out to justify the country's huge investments in nuclear energy.

India has already spent around Rs 14,000 crores for nuclear power. In the current 1986-87 Union Budget, a sum of Rs 469.21 crores has been allocated for existing and upcoming atomic power projects in the country. By the turn of the century, the annual allocation is expected to exceed Rs 1,000 crores.

In comparison to the huge investments made, our achievements have been insignificant. The installed capacity of 1,330 MW does not comprise even five per cent of our total power generation. But we are aiming still higher—10,000 MW in installed capacity by the year 2000. This will necessitate the commissioning of more than a dozen new plants. Nuclear energy is all set to get a spectacular boost in India. But are we ready to accept the risks as well?

Before we try to understand what the risks are, we must have an idea how power is generated in a reactor. If a particular kind of uranium atom is hit by a subatomic particle called neutron, the uranium atom is broken up into two fragments whose total mass adds up to slightly less than the parent atom. The missing mass, in deference to Einstein's famous $E=mc^2$ equation, produces a huge amount of energy. It is the same energy that is used in a bomb for destruction, or exploded in an experiment. In a reactor, this energy is trapped by engineers to boil water to steam and to run turbines in order to generate electricity. In a sense, therefore, reactors are nothing but replicas of bombs.

The only difference is that in reactors, the breaking-up process (of a uranium atom) is controlled, so that the energy unleashed can be used for constructive purposes. This requires, among other things, a steady flow of slow-moving neutrons. To ensure that the speed is kept slow, they are passed through a moderator medium—generally a liquid like water, or sometimes a solid like carbon (as was the case at Chernobyl). Once the nuclear reaction process runs at a controlled pace, the energy is extracted out of it in the form of heat.

Atomic power plants around the world are grouped into several categories, according to their use of specific moderators and the mode of extraction of the heat generated. The two reactors at Tarapur are boiling water reactors (BWR) as they use water to extract heat (and incidentally, to moderate neutrons as well). A huge amount of heat boils water to steam which makes the turbines whirl. The steam, after it has finished its job of rotating a turbine, is condensed to water and pumped back to be heated again. At Tarapur, the malfunctioning of the pumps used for this purpose are said to have caused the leakages of radioactivity at the plant.

Incidentally, one theory about the Chernobyl disaster also assumes pump failure leading to loss of coolant water in the reactor core. It is believed, in the absence of specific information about the actual sequence of events, that with insufficient water to cool, the heat generated in some part of the core, the fuel kept on burning uninhibited till the cladding around it melted. This in turn heated the graphite (carbon) bricks surrounding the fuel, which are used for moderating projectile neutrons. Operators might have tried to contain the runaway heat by showering water on the reactor, setting off in the process another reaction, in which water combines with hot graphite to produce flammable hydrogen, methane and carbon monoxide.

Will such a scenario ever befall Tarapur? "No," says Dr Raja Ramanna, chairman of the Atomic Energy Commission. "It is true that due to high density of energy being released inside a nuclear plant, it needs to be continuously cooled and that such a cooling system must never fail. It is for this reason that all reactors lay special emphasis on measures to avoid loss-of-coolant accidents. This is done by ensuring that even in the highly remote possibility of the coolant supply being interrupted, there are two or more backup systems to handle it. These backup systems are designed as fail-safe arrangements, which means that if something goes wrong even with these backup systems—should they too fail—they would do so by automatically shutting down the reactor. Then there is the inbuilt feature called 'negative temperature coefficient of reactivity.' This simply means that if the temperature goes up inside the reactor core, the reactivity will come down, thereby halting the reaction there."

Dr M.R. Srinivasan, chairman of the Nuclear Power Board, rules out Cherbonyl-type accidents in India with the argument that our plants are of a different design. "None of our reactors use graphite," he explains, "so a graphite-related fire is not relevant in our context. Secondly, the reactor at Cherbonyl was encased in an industrial-type building—structural columns with cladding. Although the reactor core itself was in a concrete pit, the top of the reactor was similar to normal industrial structures. At our Madras Atomic Power Station at Kalpakkam, the concrete reactor building has been designed to withstand the maximum possible pressure that can be generated in the event of the worst accident."

True, Indian reactors have a number of distinctive features. And their dependence on heavy water (a rare variety of water) is an added advantage in this regard. For, heavy water being the moderating medium, the uranium fuel cannot sustain fission reaction without it. So if the water is lost, there is no chance of any neutronic reaction. Once the fission reaction stops, the neut-

ron population in the reactor dwindles, shutting off the fission process. But Dr Srinivasan's assertion is not all that convincing in the context of the next generation of reactors the country is going to build. A sense of laxity with regard to containment structures is evident at the new, upcoming fast breeder reactors. We are planning to do away with the shell structure covering the reactor vessel.

Reactors of this type produce energy through plutonium fission. They are called breeder reactors since during the process of operation they give birth to new fuel. That is to say, rather than only gobbling up fuel, they breed it too. In fact, they breed more than they consume—1.2 kg of plutonium for every 1 kg spent. They are called fast, as unlike the first-generation reactors that use slow-moving (due to moderation) particles to hit the atoms of the fuel element, the bombarding particles are fast enough here. Because the hitting particles are fast in this case, concentration of fuel atoms—that is, their number in a given volume of fuel element—has to be very high. Otherwise, the fast-moving bombarding particles, without finding a few fuel atoms around to collide with, will disperse. Once again, it is this high concentration of fuel element (plutonium in this case) that makes fast reactors a lot more tricky to handle in comparison to the first-generation machines.

In the first place, they produce tremendous amounts of heat which need to be removed at an exceedingly fast pace to avoid a "meltdown" of the core of the reactor, a situation akin to an atomic blast. The operational tactics of the fast reactors indicate that there should be provision for enough built-in safety mechanisms, including a way to close it down at split second notice.

In the first-generation reactors, heat is extracted from the core by pumping and taking out water through it. But the limited heat capacity (the power to absorb heat) of water has led to its replacement in fast breeders, where sodium is used to extract heat: sodium can absorb a lot more heat without becoming extremely hot. However, the advantage in this case is not one-sided, for it is this use of sodium that besets fast reactors with problems as well.

The metal is highly reactive. It burns in contact with air and reacts violently with water. It must be noted that fast breeders also use water— for making steam to rotate turbines—which takes heat from hot sodium instead of the core itself, as is the case in a BWR.

Fast breeders, because of their complicated operational tactics, are the most hazardous and expensive means known to Man for boiling water. And quite unlike other systems that generate energy, a fast reactor seems always capable of destroying itself in the act. It is always capable of producing much more energy than the structure can contain. An extremely complex system of electronic sensors and other controls are necessary to ensure that a certain rate of reactivity is maintained at safe operating temperatures. To achieve this, a number of systems are arranged, the most prominent being the control rods.

Control rods, which are made of boron carbide, are dropped into the fuel core in case of an emergency like over-reactivity and overheating of the fuel. Since boron is a very good absorber of neutrons, it is used to neutralise them in an emergency, and thus control a power excursion or shut down the reactor. It must be remembered that maintaining fission at a constant rate is not enough for controlling core temperature, the coolant has also to be circulated every moment for continuous heat extraction. If for some reason the coolant circulation were to fail, because of any exigency like a leak in the pipes, or a malfunction of the pumps, the core would heat up enormously. At a time when advanced countries such as the United States, Britain, France, and Italy are still experimenting with such a complex technology, India's headlong plunge into it has been severely criticised by experts.

The fast breeder test reactor (FBTR) at Kalpakkam has been designed on the pattern of the French test reactor Rapsodie which was shut down after an operational life of 15 years following a sodium leak. What will happen in the event of such a leak here?

Scientists at Kalpakkam have adopted a number of innovations, and what they claim to be improvements. One such innovation is the change of the fuel. While the Rapsodie plant used plutonium and uranium dioxide, the Kalpakkam FBTR is using mixed carbides of uranium and plutonium. The mixture, it is claimed by its inventors, will lead to the desired negative reactor activity. But what if there is a sudden loss of coolant? "Nothing will happen," explains Dr C.V. Sundaram, project director of the FBTR. "The boron carbide control rods can take over the scene within a split second of an emergency. They just take less than a tenth of a second to fall into the core. The arrangement is redundant really. While only one rod can stop the reaction, there are six at the ready."

But what about the double containment? Although the Kalpakkam FBTR possesses this system, the prototype 500-MW plant to be shortly built in India (for which designs are ready) will dispense with one of the containments. The Prime Minister, addressing the parliamentary consultative committee, however, stressed that the main reason for the added safety of Indian plants was their double containment system. Did Mr Gandhi mislead the MPs? Unfortunately, in India we do not have an independent agency to monitor the safety aspects of nuclear reactors. And unlike other countries in which nuclear power generation is taking place, in India the proponents and advocates of nuclear power are in a dominant position, able to stifle all objections and criticism.

/12828
CSO: 5150/0126

KUWAIT

FOOD FROM EASTERN EUROPE BANNED TO AVOID NUCLEAR CONTAMINATION

Kuwait AL-SIYASAH in Arabic 15 May 86 p 1

[Article: "The Municipality Prohibits the Importation of Food from Eastern Europe"]

[Text] The Municipality of Kuwait issued a general proclamation to all the food inspection centers in the country banning all milk and diary products, as well as fresh, canned, and frozen fruits and vegetables produced after 20 April 86 imported into the country from the Soviet Union, Romania, Poland, and Czechoslovakia. This action, taken in complete coordination with the concerned departments of the Ministry of Public Health, is valid until further notice. This was announced in Internal Proclamation No 56/86, which was signed by the director of the Food and Store Licensing Administration, and which included the following:

In the endeavor to preserve the public health and based on what has been announced by the Ministry of Public Health concerning food imported from the region of the nuclear explosion in the Soviet Union, the following has been decided:

First, the importation of milk and dairy products and fresh, frozen, and canned fruits and vegetables produced after 20 April 86 from the Soviet Union, Romania, Poland, and Czechoslovakia is prohibited.

Second, with regard to food produced after 20 April 86 imported from Turkey, Greece, and Bulgaria, the following will occur:

1--Samples of milk and dairy products will be turned over to the anti-radiation department of the Public Health Administration at the Waqfs complex, so that comparable samples of the products may be sent to the laboratory of the Ministry of Public Health as usual to determine their soundness.

2--With regard to fresh fruits and vegetables, samples will be taken and sent to the environmental protection laboratory in front of the Shuwaykh industrial control post. Meanwhile, the shipments will be sequestered until the results are known and they are shown to be free of radiation contamination.

This will be coordinated with the environmental protection laboratory. Telephone for this purpose: 835483.

13292/12859
CSO: 5100/4516

PAKISTAN

NUCLEAR PROGRAM TERMED 'ENTIRELY PEACEFUL'

SK221039 Karachi Domestic Service in English 1005 GMT 22 Jun 86

[Text] Prime Minister Mohammad Khan Junejo has reiterated that Pakistan's nuclear program was entirely peaceful in nature and intent and was solely directed to meeting its needs for socioeconomic development. He said this while speaking at the inauguration of 11th international Nathiagali summer college on physics and contemporary (?needs) in Islamabad today.

The prime minister said Pakistan had been singled out for imposing all sorts of embargoes on equipment, basic information, and knowhow on the pretext of an imagined risk of nuclear proliferation.

Pakistan was seeking the technology of nuclear power generation because we are desparately short of energy, and our overreliance on a single resource of hydroelectricity creates problems with seasonal changes in water availability and rainfall. This adversely affects industry and agriculture. Pakistan wants to free the people of South Asia from threat of nuclear weapons and military uses of nuclear technology.

The prime minister said Pakistan is, therefore, genuinely interested in the denuclearization of South Asia and has repeatedly made a proposal for creating a nuclear weapon free zone in the region.

Earlier, the chairman of the Atomic Energy Commission, Mr Munir Ahmed Khan, in his address emphasized the need for establishing an international center on the lines of [words indistinct] center to create a new climate for the science in the country.

The Nobel laureate, Professor Abdul Salam, also emphasized the need for establishing a center of biotechnology along with the proposed center for science and technology.

/9274
CSO: 5100/4748

OBASANJO CALLS FOR NUCLEAR, WORLD SCIENTIFIC BODY

Kaduna NEW NIGERIAN in English 30 May 86 p 9

[Text]

RETIRED General Olusegun Obasanjo in Moscow proposed the establishment of a world scientific body to be known as 'Scientists for Peace and Security', according to the Moscow correspondent of the News Agency of Nigeria (NAN).

He told the second conference of Soviet scientists on problems of peace and the prevention of nuclear war that when scientists thus come together, they would influence and reduce the recriminations being thrown around by politicians, he added.

Such a body would also help to reduce the nuclear threat constantly hanging on mankind, help in improving international security and respect for human rights and create an avenue for disarmament in all areas of human endeavour.

General Obasanjo said three groups of people were responsible for world security: 'the politicians who will want to sustain themselves in power, the military establishment that will constantly seek an advantage over their adversaries and the scientists who are generally more agreeable among themselves.'

He said the security of the world thus rested more on the scientists and that with security, disarmament could come about and prosperity would be possible.

General Obasanjo and Professor Gabriel Olusanya, Director-General of the NIIA, are among the public figures and scientists from 47 countries attending the conference which will examine the problems of nuclear disarmament, possible consequences of a nuclear war and the prospects for preventing the militarisation of outer space.

/9317
CSO: 5100/38

SOUTH AFRICA

NO COMPARISON BETWEEN KOEBERG AND CHERNOBYL

Johannesburg BEELD in Afrikaans 28 May 86 p 4

[Text] Cape Town--ESCOM [the Electricity Supply Commission of South Africa] is monitoring the events at the Chernobyl Nuclear Power Station in Russia and when the causes become clearer, a decision will be made as to whether it is necessary to make modifications to the design and operation of the Koeberg Power Station near Cape Town and to the emergency plan.

This emerged from an answer by Mr. Danie Steyn, minister of Mineral and Energy Affairs, in response to various questions about Koeberg yesterday in Parliament.

Apart from the fact that Koeberg's design differs completely from that of Chernobyl, Koeberg also has an emergency plan, based on the American model, which is as comprehensive as any other emergency plan in the world.

The experts in charge of this emergency plan are among the best who are available in South Africa.

Safety at Koeberg is assured by programs of inspection and testing whenever the installation is shut down for refueling.

Mr. Steyn also said that cracks in the lowermost floating foundation occurred during and immediately after construction due to shrinkage of the concrete. A vertical construction seam in the retaining wall allowed ground water to seep into the foundation area, while hairline-cracks also appeared in the concrete of the containment building.

The cracks were sealed. The impermeability of the building is not affected because the core of the containment building is formed by a steel shell while the concrete assures mechanical strength.

To ensure that no radioactive material is released in the case of earthquakes, Koeberg has been supplied with a special foundation which is impervious to earthquakes. The basis used was an earthquake which registers 7 on the Richter scale and occurs 9 kilometers from Koeberg. The probability of such a quake is less than once in a million years.

Mr. Steyn said Koeberg would probably be able to withstand worse earthquakes.

13238/9435
CSO: 5100/32

SOUTH AFRICA

KOEBERG SAFETY PRECAUTIONS CRITICIZED

Cape Town DIE BURGER in Afrikaans 3 Jun 86 p 4

[Article "By Our City Reporter": "Koeberg Regulations Laughable, Says City Medical Officer"]

[Text] The safety precautions for 1.5 million people in the event of an accident at the Koeberg nuclear power-station are "laughable," Dr R. J. Coogan, Cape Town's city medical officer, told the council's facilities and health committee yesterday.

Contrary to international practice and principles, an unknown Escom [Electricity Supply Commission] engineer--"any manager who happens to be on duty at the time"--has final responsibility for ordering the vitally important early emergency measures to protect a million and a half people in the Greater Cape Town area, he said.

It will in addition be his duty to try to control a nuclear accident in the nuclear power-stations.

"Because of the high-handed attitude of Escom and the Atomic Energy Corporation, the Cape Town Civil Defense Organization has never been called upon to test its capacity to respond in the event of a large discharge from Koeberg."

Escom's claims that no radioactive contamination worth mentioning can reach Cape Town is made untenable by the exercixse of November 1985. It is also laughable if the consequences of the nuclear power accident at Chernobyl are taken into account, Dr Coogan said.

During the Atomic Energy Corporation's exercise in November, a radioactive cloud in theory eventually reached Paarl because of a hypothetical west wind. The scenario was, however, of short duration. If mountain wind circumstances prevailed, hundreds of thousands of people could be irradiated.

He recommended that the city council give urgent attention to the matter.

12906/13104
CSO: 5100/29

CONSTRUCTION PROBLEMS AT NUCLEAR POWER PLANTS

Delays at Kalinin Plant

Moscow STROITELNAYA GAZETA in Russian 28 Mar 86 p 1

[Article by V. Ovchinnikov: "Deadlines and Volumes"]

[Text] An alarming situation has developed in construction of the second power-generating unit--the "one-million," start-up of which should be in June of this year.

"Excessively large volumes of work must be completed. It is better to start up the power-generating unit later than the deadline and then it will operate reliably," the chief engineer of the AES [nuclear power plant] A. Mazalov characterized the situation.

The builders and installers are now working rather intensively. Soyuztsentratomenergostroy [All Union Construction of Atomic Power Stations], Minenergo SSSR [USSR Ministry of Power and Electrification], sent several installers and other specialists to the plant at the end of last year. The main installation organizations involved in the power-generating unit overfulfilled the January and February plan.

And still there was too much omitted last year.

But let us try to analyze everything in order.

The first and main question is equipment. Has everything been received?

"Practically everything," confidently answers the deputy director of the Kalinin Nuclear Power Plant for capital construction V. Ponomarev.

"There is still not enough support reinforcement," interject the brigade leaders of the installation teams, working in the reactor section.

Thus, brigade leader of the Udomlya MU [Installation Administration], Sevzapenergomontazh [Assembly of Power Systems of the Northwest and West] Ye. Malkov relates:

"Take a look, there should be five gate valves--complex, heavy, large units of special metal--in this pipeline assembly--each as thick as a good-sized log. Four of them were delivered long ago, but we have still not received the fifth one, and this occurred days ago and it was impossible to install a single one of them. There is exactly the same pattern with 'shaped' parts--cast parts for joining assemblies and pipes--pipe unions, tee-pieces and drains."

As we can see, it was early for V. Ponomarev to be calm. The following are not yet at the construction site:

fittings--more than 100 units;

equipment for the ORU-750;

shaped cast parts--more than 2 tons!

The teams of the Udomlya Installation Administration, Sevzapenergomontazh Trust, are headed by V. Moiseyev, V. Mayboroda, N. Shiryayev and T. Levchenkov, who prepared the turbine of the second power-generating unit to operate and to pump oil. Were the installers successful? Undoubtedly they were. But they are alos indignant:

"Like pirates, the operators during the night shift took the equipment sent to us for installation and used it to repair the first power-generating unit. Let us assume that these actions were justified by urgent need. But why was all this not reimbursed? And now we have prepared the oil-pump turbine ahead of schedule, but what is the use? There is nothing for it to pump, the client has the oil pump," says team leader A. Shiryayev. "Moreover, the operators are modifying the equipment after installation rather than before installation. You install and center a pump, they take everything away and then assemble it haphazardously, leave the centering to us, and sometimes many parts are missing."

"There is a lot of this confusion at the site," team leader A. Mikushin supports his colleague. "The pre-start procedures are underway, the hydrostatic tests are beginning in the machine room, but there is no drain system in the basement where we work and it fills with water. And it is also dark--there are only two-three lamps."

The chief engineer of the Gidroelektromontazh [Assembly of Hydraulic and Electric Power Systems] Administration A. Grushin expressed a similar complaint:

"Once we are required to prepare urgently the stator cooling pump for hydrostatic tests for operation. Our people worked all night and later it turned out that no one at all needed the pump."

The construction site has entered a period when plant personnel should be working alongside the installers. But there are not enough of them. There is also no coordination in the actions of neighboring workers. What does the contractor think about all of this? Here is the opinion of the deputy chief

of the construction administration of KAES [Kalinin Nuclear Power Plant] M. Rozenbaum:

"Yes, the deadlines are being tightened. It is time to begin hydrostatic tests and circulation flushing of the first circuit. To do this, 36 pipeline systems and equipment must be prepared for functional testing and far from all of them have been prepared. True, some equipment, especially electrical engineering equipment, remains to be installed. Hardly nothing has been done due to the absence of work by the heat installers. And we all do not share A. Mazalov's pessimism. The power-generating unit can be started up in June of this year and it should be."

There is experience of starting up exactly the same unit within 78 days from the beginning of hydrostatic tests and before inclusion in the network at the Southern Ukraine Nuclear Power Plant. But to transform possibility into reality, the Soyuzatomenergo All-Union Atomic Power Stations Association must send without delay operational and repair personnel of the operating service to the unit, where there is presently a shortage of more than 100 persons. And those very people must be sent who started up the unit in the Ukraine within 78 days.

To eliminate confusion, a plenipotentiary representative of the Ministry, who coordinates pre-starting procedures, is now required at the site. The director of the Kaliningrad Nuclear Power Plant, G. Shchapov, has turned over all matters related to construction of the second power-generating unit to Chief Engineer A. Mazalov. And we have already talked about his position at the very beginning of this article.

It is stated in the resolution of the 27th CPSU Congress with respect to the Political Report to the CPSU Central committee: "Modern management requires rearrangement of thinking and rejection of established stereotypes." Based on these requirements, it is obvious that the director of the Kaliningrad Nuclear Power Plant G. Shchapov and the chief of VPO [All-Union Production Association] Soyuzatomenergo, G. Veretennikov, should also solve the current problems of the construction site.

Criticism of Crimean AES Director

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 4 Apr 86 p 2

[Article by N. Pashin]

[Text] The letter was alarming. It was about how construction of the Crimean Nuclear Power Plant is limping along, as they say, on both legs, but its managers have actually resigned themselves to this. "It is time to stop deceiving ourselves and to stop enjoying imaginary well-being. We must look the truth in the eye"--these are the lines from the letter. And its author, deputy director of the power plant under construction for personnel A. Kovalenko took approximately the same tone at an election meeting.

The 14th committee, according to the official count, is now engaged in researching his personality. The first committee began to look for negative aspects of his biography immediately after the meeting.

What was the reason for such close scrutiny of a communist? It turns out that 100 persons voted against the secretary of the party committee of the power plant, V. Kurennoy--every fourth communist--at this meeting; the communists openly refused to elect the chief of the construction administration, Ya. Grigoryan, to the party committee, thus expressing complete distrust of the manager of the construction project. And both these facts are now linked to the actions of A. Kovalenko.

"Here was clear collusion of those who do not like to work, but like to criticize others," Viktor Nikolayevich Kurennoy said sharply, as if wishing to end the matter right there.

"They gathered together malcontents, people bearing some kind of grudge, and they voted against," Yakov Abramovich Grigoryan explained.

"Who gathered together?"

"We know who. Representatives of the client."

This is how the managers of the construction project--party and economic managers--evaluate the matter. But what do they think about the conflict in the Leninist regional party committee?

"Nothing foretold such a turn of events," the first secretary of the regional comittee V. Belik said to me. "The results of the vote, and it lasted for several hours, was a surprise to many. It was even unpleasant."

Alas, we feel that an attempt is seen in these words to make wishful thinking a reality, since in this case we are talking about completely regular "chance." Many of those who are involved in one way or another with the Crimean Nuclear Power Plant agree with the opinion: the construction project has dragged on excessively long; many of its problems arise more quickly than they are resolved or rather more quickly than forces and possibilities are found for solving them.

Moreover, there are also objective reasons. But there are incomparably many subjective reasons. One should begin with the fact that the present manager of the Crimean Nuclear Power Plant is already the third by count. And his predecessors cared not so much about affairs at the construction site as about personal comfort for themselves and for their elected subordinates. People saw this and unwillingly stopped believing the fiery words that all difficulties with services and housing in the settlement of energy builders of Shchelkino are temporary and that one must patiently wait for one's turn. And this turn for some reason never came for many, since the new manager began in the same manner.

Possibly, this would not be worth mentioning, but here are the recent facts: the director of the nuclear power plant under construction, O. Dmiterko, was

reprimanded by the party for "personal indiscretion in distribution of housing" and the party committee secretary, V. Kurennoy, was reprimanded for the fact that he looked through his fingers at similar facts.

No strong, healthy collective was established at the construction project from the very beginning. Some random people arrive, others are sent to different regions. It is sufficient to say that 1,400 of 1,500 workers and employees who arrived last year have been released. The same ones who completely settled in at Shchelkino were forced in one way or another to encounter a number of these daily problems, the existence itself of which one cannot explain by "outside" factors. And as a result, there is dissatisfaction of people growing from day to day.

Added to this are purely production deficiencies: weak organization of labor, endless forced idle times of construction teams, and low-level engineering preparation. As a result, only half the plan of construction-installation work was fulfilled last year, while the builders began this year even worse: the January and February plan was fulfilled by 30 and 48 percent, respectively. A services building, pharmacy, first-aid station, cleaning facilities, fire station and several dormitories were thus not constructed at Shchelkino, although they were supposed to become operational according to the plan 2 years ago. Thus, they were promised to people in any case.

And yet another thing must be said. We must talk about the interrelationships between the two hosts of the construction project--the client and contractor. Many with whom we talked at the Crimean Nuclear Power Plant characterize them this way: "The directors have an allergy to the builders and the builders have an allergy to the directors. They do not perceive each other. And the party committee, although it is said to be united, is incapable of reconciling them."

It was simply impossible not to see in all this the grounds for a direct, principle and impartial conversation about the fate of the counstruction project. And the party committee, judging by everything, saw these grounds. But a conversation with the tribunal of the election meeting was mainly about the fact of what had been done and seemed to read between the lines about existing individual deficiencies.

The deputy director for personnel, A. Kovalenko, spoke on this "background." He generally talked about what was already well known to many, and the figures are no secret. The inspiration of his speech reduced to the following: if the party committee does not rearrange the style of its work and of its relationships with the collective, then the construction project will be ruined completely.

Of course, all the foregoing could not immediately arouse communists against Kurennoy and Grigoryan. This speech only played the role of a detonator, which activated the explosion of distrust against the secretary and chief of the construction project. In the end, a person adds all the pluses and minuses of real life, as was said at the 27th CPSU Congress, to the figure of party management and to his personal and business qualities. And the

communists gave their grade to these qualities. What is the surprise here? Where is the "collusion?"

It would seem that the party committee of the construction project and the party regional committee, after all that has happened, should immediately analyze what communist Kovalenko said. But is there truly not the strength of a better tradition: to analyze the person himself. Who is this Kovalenko, really? How and from where did he appear in the Crimea? Does he not have past sins? "Public opinion"--understandably, far from the best--began to form immediately around the "truth-seeker."

Anonymous letters against Kovalenko, which were sent to various local departments, were yet another occasion for this. The Crimean party regional committee and the Leninist regional committee, the oblast financial department, the oblast bank, militia, oblast committee of people's control, oblast trade-union committee and Association Krymenergo quickly verified them. Instructor of the Crimean Oblast Party Committee Ye. Denisenko personally made the rounds of teachers of the settlement kindergartens and asked them questions, with the contents of which a wide reading audience was not acquainted.

We admit completely that communist Kovalenko, as is said, is no angel, and that he has some deficiencies in his work. But we note that the primary party organization during its analysis gave him a quite positive characteristic. Is it that the regional committee and even the oblast party committee do not trust the opinion of communists over the local committee?

Incidentally, other questions as well arise. If an unworthy person comes out directly with objective criticism, then why do communists who have nothing to reproach in anthing, remain silent? And how do people now ascertain that both the anonymous letters and the checks begun after the meeting are only random coincidences and not an attempt to deal with a person for criticism? And this is what very very many in the settlement think.

Yes, the skill to extract valuable lessons from critical comments rather than to defend oneself against them with all accessible (and even inaccessible) means should be inherent in each manager--both party and economic. It should become one of the main components of the style and methods of their work with people and with the collective. We agree that this is not a simple art, primarily requiring conviction of the reightness and validity of one's actions and one's position. If this is not true, then the desire" to go rummaging into the personality of the one who appears with the criticism inevitably occurs. And sometimes it is not even from a feeling of vengeance or from a desire to settle personal accounts with a person or to teach him a lesson for the future, but again to find a reliable defense: but then, who is the judge?

Is he reliable? No, it only seems so. Because the most valid and most reliable and effective response to criticism remains the desire to correct deficiencies and to open the way to a healthy, leading attitude. Unfortunately, those who resorted to the personal matter of communist Kovalenko rather than the "private matter" of a construction project tormented by many deficiencies did not understand this.

"It should be admitted," agreed the secretary of the Crimean Oblast Party Committee V. Pigarev, "that the party organization of the construction project lacks real combativeness and this is true primarily of the secretary of the party committee. Another thing is also clear: the Leninist regional committee was unable to evaluate in time and correctly the situation in the collective and to assist Kurennoy to occupy a valid position here."

I listened to the secretary of the oblast party committee and thought: it is of course good that they understand this in the oblast committee. But, from recognition of deficiencies and omissions in their work, a real, specific step must be taken to see that they do not occur again over time. This is even more important, since introduction of the capacities of the Crimean Nuclear Power Plant is envisioned by the Basic Directions for the Economic and Social Development of the Country. The collective of the construction project must solve very serious tasks--to assimilate 60 million rubles of capital investments this year and to start the first power-generating unit next year.

And it is felt, in voting at the election meeting against V. Kurennoy and Ya. Grigoryan, that the communists have thus expressed severe doubts that they will be able to bring the construction project successfully to these important positions.

6521/12913
CSO: 1822/253

USSR

PLANS FOR SIXTH REACTOR AT NOVOVORONEZH AES

Moscow PRAVDA in Russian 23 Mar 86 p 1

[Article by Pravda Correspondent A. Starukhin: "A Match for the Plant" under the rubric: "The Eve of the Event"]

> [Text] Voronezhskaya Oblast -- Above the almost 80 meter tall cone of reactors near the Don River there is the blue spring sky. In the heat water reservoir of the station there are carp swimming. It is the best medium for them to be kept, and they lack for nothing. The yet unmelted snow is white all around, only emphasizing the sterile cleanliness of the space here.

Today there are the ordinary sounds of a nuclear power station. It is almost like a plant, like any common factory. And time contributes to this. The Novovoronezhskaya AES will soon be 22 years old. At first there was a power unit with 210 megaWatt capacity, and it was unusual, like a "giant". Over the years the nuclear "draft horse" has been supplemented by three units, and the latter were almost twice as powerful. Finally, the fifth unit, the "millionaire" has put the prior performance of its ancestors to shame.

This does not mean, certainly, that the older equipment will be retired immediately. Recently, for example, the first unit underwent a complete inspection, with the participation of scientists and designers. Their conclusion was that after reconstruction it will still be usable. And now the nuclear "storms" have abated in it somewhat, and it is time for capital repair.

The crew of the station is the winner in the All-Union Socialist Competition. Since the first of the year it has produced almost one and one-half times as much power as has been seen before.

This nuclear plant has long been a school for leading experience, and cadres for other plants are trained here. In the last Five-Year Plan alone, the Novovoronezhskaya AES provided training and practice for 2,200 specialists.

The task facing the station's crew is not easy. Reconstruction of the first power unit will take more than a year. But they are already preparing the technical basis at the site of the regular, the sixth "millionaire" reactor.

1952
CSO: 1822/255

USSR

BALAKOVO PLANT DESIGNER ON EXPEDITING AES CONSTRUCTION

Moscow STROITELNAYA GAZETA in Russian 23 Mar 86 p 2

[Article by Yu. Kovrigin Chief Engineer of the Organization for Planning Equipment and Construction for the Balakovskaya AES: "Conveyer for the "Millionaire': How to Equip an AES More Quickly" under the rubric : "Under the Heading of New Directions"]

> [Text] Saratovskaya Oblast -- The 12th Five Year Plan contains provisions for intensive development of nuclear power. In particular, there are provisions for significant acceleration of the construction of nuclear power plants, particularly in the European part of the country, and increasing the return on investments.
>
> This direction, provided for in the USSR Power Program and also in the Combined Program for Scientific and Technical Progress of the Country and CMEA Members, was confirmed in the Resolutions of the 27th Party Congress as one of our basic power programs.

The basic directions provide for construction of a series of nuclear power plants which are intended to be partially or completely brought on stream during the 12th Five Year Plan.

The first of these to be equipped are the Zaporozhskaya and Balakovskaya AES. It is intended that the technology of rapid construction of the mass-production AES is to be developed. But the 12th Five Year Plan has begun, and there are still disagreements about what this rapid technology is supposed to be.

I note that the project for construction organization here provides for the technology of erecting the reactor section, the most complex and labor intensive installation. And here it is very important to select the correct lifting mechanism to use at the construction site.

At the Zaporozhskaya AES this was an imported crane. Using it, they installed previously assembled structural members weighing up to 240 tons. Therefore the heaviest equipment was installed only after the reactor section was "closed" by the working, the "polar" crane which was set up there. This equipment is quite complex and labor intensive, and demands large expenditures of time.

Principles for other equipment to be used at the Balakovskaya AES were developed by the Kuybyshev Affiliate of Teploenergoproyekt [the All-Union Institute for the Planning of Electric Power Projects] working with the engineering service of the general contractor, Saratovgesstroy [the Saratov Power Plant Construction Trust]. It suggests erecting an industrial installation conveyer when the pressure chamber of the reactor section is built. Such a capability exists if it is equipped with a KZ×100 gantry crane, a domestically-produced product with 380 ton lifting capacity. An assembly and prefabrication installation zone is also equipped with a self-propelled platform conductor "plaza", on which are prepared units of metal structural members for the pressure chamber. They are ready for installation in the plant and weigh 300-380 tons. They are assembled in layers (on marks), and have an overall mass of 1,000-1,500 tons on the plazas, and then are placed on the reactor section installation zone in a special way, and there they are set into place by a gantry crane.

Unfortunately, the crane arrived too late, and they did not manage to set up the conveyer at the first power unit. But nevertheless its use has allowed them to save six months. Using it, they have completed 70 percent of the most labor-intensive work.

Thanks to the conveyer and the gantry crane at the second power unit building the support panel was installed and concreted in from mark 10.8 to mark 13.2 in three months (whereas on the first power unit, this took us to 13 months).

According to calculations, the industrial installation conveyer can double the rate of erection of the pressure chamber, as installation of all the technical equipment in the complex can be done in one year rather than two. During this the number of installed units is decreased from 168 to 41, and the length of welded piles which are installed at altitude are 2.4 times less. The productivity of labor on the pressure vessel increases by 14-16 percent, and that expended directly on installation is 1.7 times greater. Instead of 800 workers under the previous system of organization, now there are 190.

The experience in construction of the Balakovskaya AES, where the "KZ×100" industrial installation conveyer was used, allows us to conclude that simply due to the use of this high weight capacity equipment there will have to be developed a standard rapid technology for further assembly of mass-produced AES's.

Nevertheless the scientific and technical council of the USSR Minenergo [Ministry of Power and Electrification] has for some reason recommended the purchase of imported cranes to be used in construction of the Rostovskaya, Tatarskaya, and Rostovskaya AES's.

Why is it that, since those which have the capacity of the "KZ×100" are twice as expensive, and they cannot be used to conduct the combined schedule of unit installation of heavy, large-capacity technical equipment for the reactor unit?

As early as 1980 the idea of setting up high capacity gantry cranes for AES construction was approved by the technical council of Minenergo. Then the support in the Ministry ended, and the first KZ×100 crane was produced by the Zaporozhskiy Electro-Mechanical Plant according to blueprints furnished by

the Kharkovskiy Energomontazhproyekt only because of the persistence of the Balakovo nuclear installers. Then its lifting capacity was increased up to 400 tons. But now the plans for the crane are gathering dust in the archives.

There have been references to the fact that the specific expenditures for using "K2x190" cranes are higher than those of the "SKR" crane. But in the first place, this indicator is not better when the equipment is imported, and secondly, one must judge economy in terms of the final results. And the accounts show that the proposed decisions to organize rapid construction of an AES cannot exist without use of the "K2x190", and these would save hundreds of millions of rubles.

They say that the 400-ton crane is uneconomical for loads weighing up to ten tons, and there are more than 25,000 of these at the construction site of an AES. Well, that's true. However, in Balakovo we lifted these primarily using lesser-capacity cranes.

There is another way out of this -- we have to find, through decisive reevaluation of plans, whether it would be possible to assemble the reactor section in the old way out of small concrete panels and unit boxes, and combine their design so that they could then be installed in large units.

The root imbalances in design decisions are set out in the fact that during analysis of the project for one or another enterprise or industrial complex there is attention paid to the basic indicators which characterize the economic effectiveness of future production. The effectiveness of this organization of production is essentially unevaluated. It is not surprising that the general designer is not interested in modernization of construction methods, and its industrialization.

At the 27th Party Congress there was talk of the necessity for accelerating the construction of nuclear power plants, and combining at the planning stage the construction and the provision of financing. This is certainly correct. But it is very important also, in my opinion, to organize construction more effectively, and to use internal reserves. And these, as is seen by the experience of the Balakovskaya AES construction, are still large.

[illegible]
CSO: 1822/255

FINNISH OFFICIAL ON CHERNOBYL, POSSIBLE VISIT BY USSR GROUP

LD292245 Helsinki International Service in Finnish 1500 GMT 29 May 86

[Text] A high-level visit from the USSR can be expected in Finland in the near future. The matter was discussed during a visit to Moscow by a 10-man delegation from the Diet Foreign Affairs Committee. The name of the Soviet leader coming to Finland has not, however, been disclosed yet. During their visit the members of the Foreign Affairs Committee met, among others, Vadim Zagladin, first deputy head of the International Department of the CPSU Central Committee, and Georgiy Arbatov, a leading expert on Soviet Foreign Policy. The discussion also touched upon the Chernobyl nuclear power station accident, says Chairman of the Foreign Affairs Committee Erkki Liikanen in an interview with Reijo Nikkilae.

[Begin recording] [Nikkilae] Chairman of the Diet Foreign Affairs Committee Erkki Liikanen, was the Chernobyl accident touched upon in these discussions?

[Liikanen] Yes, we discussed it. We noted that in Finland the government has been criticized in this matter and this was apparently the case here, too. This was noted and the Soviet representatives examined their own actions in this connection very openly and critically. They stressed that the flow of information inside the country was too slow. The country's leadership did not hear about the real scale of the accident early enough. Now the question is how to proceed in future, and I noted that they are very ready to take strong measures to increase the flow of international information on these problems and to strengthen the position of the IAEA and, perhaps, also to stress that when such a limited disaster in the peaceful use of nuclear power occurs, what would the situation be in war or if nuclear weapons were used, even one nuclear warhead would mean a disaster many times the scale of this Chernobyl disaster which is serious in itself.

[Nikkilae] No member of the present Soviet leadership has visited Finland yet; was this matter discussed?

[Liikanen] Yes, we took up this matter, too. We noted that the USSR has a new dynamic, active leadership, but they lack one thing--there are only few members in the [word indistinct] who have visited Finland. The Soviet side admitted this readily and we were convinced that this problem would soon be put right.

[Nikkilae] How soon and at what level?

[Liikanen] Well, there has already been talk for some time that a visit in return for President Koivisto's visit to the USSR is imminent. It will probably be before too long and in addition there are, of course, high level visits expected at party level during this year still.

[Nikkilae] Of what kind?

[Liikanen] We have had confirmation that a CPSU delegation will come as guests of the Social Democratic Party this year.

[Nikkilae] And it will be led by a member of the Politburo?

[Liikanen] Well, I have to say that up to now these visits have been at the level of a Politburo member or a Central Committee secretary, which we, of course [words indistinct]. [end recording]

/12913
CSO: 5100/17

USSR

BRIEFS

EXTRA WORK AT THE IZHORSKIY PLANT--The collective of the "5000" unit is the flagman of the domestic nuclear power equipment association "Izhorskiy Plant" in Leningrad. It decided to work a Communist Subbotnik [Saturday work day] in honor of the 27th Party Congress with increased labor productivity. On the unit are rolled sheets of high quality steel which are designed for the manufacture of power equipment for nuclear power plants. The shock labor day will be an impetus for accelerating completion of the increased production of rolled steel, an obligation assumed in honor of the 27th Party Congress, in which the unit is to complete its year's task in less than six months. [Text] [Moscow SELSKAYA ZHIZN in Russian 23 Jan 86 p 1]

AZERBAYDZHANSKAYA AES DECLARED SHOCK PROJECT --Azerbaydzhanskaya SSR-- Construction of the nuclear power station is declared a shock project. "There are already preparations underway," reports the leader of the "Azenergostroy" Trust, Rasul Gamidov. Introduction of the first power unit of the plant is planned for 1992. The power from our nuclear power plant will be used in all the transcaucasian republics. The cadre for our station are being trained at Obninskiy Nuclear Power Institute and the Azerbaydzhanskiy Institute of Petrochemistry imeni M. Azibekov. We are organizing a special professional and technical school for 750 persons. More than 30 institutes of the nation, together with six republic-level [institutes] are planning the various production projects for the AES. At the "Azgosproekt" [presumably Azerbaydzhan State Planning Institute] there has already been completed the general plan for the future village for construction workers and plant personnel. In the new city for nuclear power plant personnel will be five-, nine- and twelve-apartment buildings with improved planning of apartments. They will form four neighborhoods, united by an administrative-cultural and trade-services center, with a medical facility, sports facilities, a wooded park on the banks of the reservoir, and docks for sail and rowboats. There are plans for schools, child care facilities, and day nurseries. In short, everything that there would be in a modern city [will be here]. [Text] [Article by K. Madatov: "A New City is Being Built", Moscow NEDELYA in Russian, No. 8, 17- 23 Feb 86 p 5]

AUTOMATED SYSTEM AT ZAPOROZHSKAYA AES --Energodar--Specialists have started installing an automated control system for the basic equipment of the third power unit of the Zaporozhskaya AES. Such tempi of work as are being achieved on the site of the Zaporozhskaya AES are previously unknown in the nuclear power industry. Recently work was begun of the first power unit with a one million kiloWatt capacity, and the second is right behind it. And today they are finishing work on the framework for the foundation of the sixth unit. The interval separating the power engineers from the regular start up of the next "millionaire" has been shortened to one year! The basis of such a high rate is the streamed method of AES construction, first introduced in Energodar. "We are now finishing installation work on the third power unit", reported the

Chief Engineer of the site V. Dudnik, himself a high-class installer. In a few days the basic installation will be completed on the turbines with one million kiloWatt capacity. In a month we will begin testing the generator. [Text] [Article by A. Kaybyshev: "Shock Speed", Moscow IZVESTIYA in Russian 5 Apr 86 p 1]

FOURTH POWER UNIT AT KURSKAYA AES--Working at planned capacity of one million kiloWatts is the fourth power unit of the Kurskaya AES, which delivered its first current at the beginning of December of last year. The crew of power engineers delivered this one and one-half months ahead of plan. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No. 8, Feb 86 p 5]

CONSTRUCTION OF TATARSKAYA AES--Kamskiye Polyany, Tatarskaya ASSR-- The new power center, the Tatarskaya AES is being born on the Nizhnyaya Kama. On 19 March at the industrial site where the reactor hall will be built, the first shovelful of dirt was removed. This honor was won by the unified crew of scraper operators of Cavalier of the Order of Lenin U. Naurbiyev, from the "Kamgesenergostroy" Association. In the rapidly growing Nizhnekamskiy Territorial-Production Complex there are now five thermal and hydro- power plants in operation. With the introduction of the AES, whose construction was described in the Basic Directions, the power potential of the region will double. At a solemn meeting of the builders and the installers in answer to the decisions of the 27th Party Congress, they accepted an obligation to accelerate the start up of the first power unit by one and one-half times. [Text][Article: "The Address of the New Structure is the Tatarskaya AES", Moscow STROITELNAYA GAZETA 21 Mar 86 p 1]

CONSTRUCTION START FOR TATARSKAYA AES REACTOR UNIT--Kamskiye Polyany, Tatarskaya ASSR--The first shovelful of earth has been dug up from the site of the future reactor section of the Tatarskaya Nuclear Power Plant which is under construction. On the banks of the Nizhnyaya Kama there is being built one of the most power AES's in the country. The crews of power construction personnel have already started on the sites for the Pioneer base, the loading dock, the purification building, and have laid about one hundred kilometers of roads. The first multi-story apartment buildings have been erected. [Text] [Article by Pravda Correspondent N. Morozov: "A Nuclear Plant is Born", Moscow PRAVDA in Russian 30 Mar 86 p 2]

NEW EQUIPMENT FOR IZHORSKIY PLANT--Komsomolsk-na-Amure--One entire railroad train was required to transport a grinding machine for preparing castings which was ordered by the Leningrad Production Association "Izhorskiy Plant", and was manufactured by a crew of the "Amurlitmash" Plant. The building of this machine, the first in this country, makes possible preparation of units weighing up to 200 tons, and allows the power construction personnel to substantially increase the productivity of labor and the quality of processing for parts for pipes and other large-capacity units. The order from the Leningraders was filled by the machine builders on the Amur two months ahead of schedule. [Text][Article by V. Dolgodvorov: "The Order from Izhorskiy", Moscow TRUD 10 Apr 86 p 2]

ROMANIA SUPPLIES EQUIPMENT--Bucharest--A number of Romania's industrial centers are taking part in implementation of the CEMA program for the development of nuclear power. Thus, electrically activated hermetic valves for the nuclear power station in Paks, Hungary, are being manufactured at a technological equipment combine in Tirgoviste. Bucharest heavy machine building enterprises have put into production main circulation pumps for the Bulgarian nuclear power station at Kozloduy and reactor components for the nuclear power station at Dukovany in the CSSR, built with the Soviet Union's technical assistance. [V. Volodin dispatch: "Romania" under the rubric "From the IZVESTIYA Teletype Room"] [Text] [Moscow IZVESTIYA in Russian 3 Jun 86 Morning Edition p 4 PM] /12913

CSO: 5100/16

BELGIUM

SWEDEN'S ASEA-ATOM TO DELIVER URANIUM FUEL TO BELGONUCLEAIRE

Stockholm DAGENS NYHETER in Swedish 6 May 86 p 7

[Article by Claes J. B. Lofgren]

[Text] Asea-Atom has been granted permission by the Swedish Nuclear Energy Board to deliver 20 kg uranium fuel to the Belgian company Belgonucleaire. This is a test delivery that could result in a larger order of about 20 tons of uranium.

Asea-Atom manufactures about 200 tons of uranium fuel. The company's nuclear fuel division had total sales of 700 million kronor last year.

"This is a good business deal," said Erland Tenerz, chief of the nuclear fuel division.

About 90 percent of the company's production is sold on the Swedish market. Asea-Atom is active on the international market, as well.

"The crisis in the nuclear power industry has not affected fuel production. After all, the reactors that use our fuel are already there and the longer they operate, the more efficient the utilization of their capacity will be. This increases their fuel needs," Tenerz said.

Asea-Atom competes with three other fuel producers on the world market: the West German firm Siemens (through its subsidiary Kraftverksunionen in Sweden), Exxon of the United States, and the French firm Framatom.

Provides Raw Material

Asea-Atom has no supply of the raw uranium material. The customer provides the raw material, which is delivered in conjunction with the order. The material is transported by ship and truck in closed containers.

The uranium comes to Sweden in the form of a powder--uranium hexafluoride. At the factory in Vasteras the uranium powder is heated and converted to a gas.

"Throughout the entire production process the uranium emits no radioactive radiation. The fuel becomes radioactive only after it is irradiated in the reactor core," Tenerz said.

Emergency Stockpiles

Asea-Atom also has an emergency stockpile of 200 tons of uranium. Sweden has a total of about 450 tons of uranium fuel stored in emergency stockpiles and at the country's 12 reactors. The government makes the final decision on permission to export uranium fuel. The Nuclear Energy Board prepared Asea-Atom's applications.

9336
CSO: 5100/2527

FEDERAL REPUBLIC OF GERMANY

BRIEFS

URANIUM PELLETS FROM SWEDEN--Asea-Atom's trade in nuclear fuel is becoming more and more extensive. The government has granted a permit for the company to export 10,500 kg uranium dioxide powder to the West German firm Reaktorbrennelementunion. The West German company, in turn, will export the uranium powder to a Belgian nuclear power plant. Of the 10,500 kg that Asea-Atom may export in this transaction, 383 kg consists of the isotope uranium-235, which can be used in nuclear weapons. Earlier this year Asea-Atom was given the government's permission to export uranium to the United States and to Finland. In addition, Asea-Atom has applied to the government for permission to export 200 kg so-called spent uranium to Belgium. This application has been approved by the Swedish Nuclear Energy Board and, consequently, it probably will be approved. [Text] [Stockholm DAGENS NYHETER in Swedish 28 May 86 p 6] 9336

CSO: 5100/2527

ITALY

ANTINUCLEAR PROTESTERS CRITICIZE ENERGY PLAN, CONTROLS

Implications of Antinuclear Call

Rome L'ESPRESSO in Italian 18 May 86 pp 6-11

[Article by Gad Lerner: "Atom Stop"]

[Excerpts] The radioactive cloud alarm has prompted mobilization throughout the country: ecologists in the squares, referendum proposals, and polemics of the parties. However, could we do without atomic energy? And how?

Anti-PEN Wave

The life of the people of Caorso and the other citizens of Lazio, Piemonte, Puglia and Lombardia who are ENEL candidates for living with the atom could change quickly if, as is probable, the antinuclear wave now underway in the country succeeds in actually blocking the National Energy Plan (PEN). this wave is led by the numerous ecology movements that have gone into the streets in Rome and are promoting the idea of a referendum, after having caused a backward step by the PCI and a split in the five-party forces themselves.

However, can Italy really do without the 12,400 megawatts of additional nuclear power planned by the PEN? Or, to the contrary, is the economic growth already again facing a new nightmare of power blackout in 1995, as ENEL implies? And if we really do give up nuclear power, what is the realistic alternative? For our understanding, let us see what objectives the antinuclear offensive is targeting and conclude what are its possibilities of success.

Nuclear Plan

First of all, there is only one nuclear power station actually under construction: the one at Montalto di Castro, in northern Lazio, which in theory is to go into operation in 1990, but where the workers are progressing, Italian style, with considerable delay and glaring cost overruns. There follow in order Trino Vercellese, where the siting of the new plant next to the small one that is to be dismantled was approved last year. Preliminary activities are now underway to set up the workyard, but actual work has not started yet. In theory, it should be ready in 1994, but this goal also

appears inachievable. Especially since the Piemonte PCI has now called for halting the work.

Let us turn to the envisaged Lombardia power plant, for which the site at Viadana in Mantova Province has been mentioned, but there is strong opposition and no final decision has been made. Here also, the PCI has changed its thinking since Chernobyl and is calling for cancellation of the siting. In theory, it was to go into operation in 1995. The Puglia site, between Avetrana and Carovigno, is still to be selected: here the people have mounted genuine revolts to force the regional council to retract its favorable decision. Here the plant was to go into operation in 1996.

Thus, except in the case of Caorso (in operation) and Montalto di Castro (under construction), it is a matter for the antinuclear people of shutting down a very long-deadline plan that is now only on paper and has nothing to do with the possible energy demand in the next decade. As is known, in Italy paralyzing a plan that is only written on paper is very easy, especially if the Communist Party no longer cooperates in gaining acceptance of the plan by the affected populations, and if the Sword of Damocles of a referendum is hanging over everyone.

Three Referenda

The idea came to the Radical Party, to which were quickly added the Proletarian Democratic Party, the environmentalist associations (Environment League, WWF, Our Italy, Friends of the Earth), the Green lists, the Communist Youth, CGIL Secretary Fausto Bertinotti, and other supporters of the left. How can one quickly carry out a consultation of the people, when it is known what Italians think of the nuclear choice. The legal expedient has been found within Law 8, already strongly criticized by the environmentalists because regarded as an instrument of "corruption" of the local party bodies by the central government.

An initial referendum will thus ask abrogation of the rule that the state "pays" the communes hosting power plants. A second referendum will oppose the rule that the CIPE can decide the location of the power plant even against the view of the involved commune.

Finally, a third referendum will target directly the ENEL's nuclear strategy, calling for abrogation of the law by which the body can draw up international contracts.

In practice, this a matter of hindering the operation of the famous Super Phenix, located in France,and Creys-Malville, near the border with Italy and Switzerland, in which ENEL has a significant participation. It is a high-speed reactor of the new generation, capable of producing plutonium with the same uranium that feeds it: a "nuclear plant of the future" termed by the Greens to be as dangerous as an atomic bomb.

Divided PCI

For the PCI, the backward step from the prevailing policy of "democratic

control over nuclear energy" will be neither easy nor painless. Why? Because in at least two regions, Piemonte and Emilia Romagna, it was the PCI itself that was promoting and managing the nuclear decision. The people of Turin remember with some bitterness that date of 4 January 1985, when Communist Luigi Rivalta, vice chairman of the then Red council of the region, called for a vote in favor of the Trino Vercellese power plant at the very time the police in the square below were charging the Greens, Demo-Proletarians and FGCI [Communist Youth Federation] demonstrators. There then arose in the party a traumatic rift between the antinuclear youth Livia Turco (recently promoted to the party's national secretariat) and the policy pursued by Piero Fassino. Today, Rivalta admits: "After Chernobyl, a politician cannot regard as remote the probability of a nuclear incident." But how will the necessity to freeze construction be explained to the Communist mayor of Trino Vercellese, Antonio De Maria, who had announced at the outset that Law 8 would bring 6 billion a year into the commune's treasury?

In Lombardia, it was the pronuclear Mantova man Massimo Chiaventi who opened the meeting of the Communist regional committee by admitting the necessity for a "pause for thought." And Secretary Roberto Vitali had to conclude by saying: "I was in favor of the nuclear decision, but now we must rethink it." At that point, also the position taken by the national secretariat, favoring a revision in the PEN, was becoming a necessary move.

Yet, imagine how difficult it will be to handle this decision for someone like Enrico Fanzini, artisan producer of door frames and also mayor of Caorso: "Thanks to Law 8 we have already restored the Loggia, the area's only monument, and we have prepared a plan to construct warehouses adaptable for industry or crafts. Also, we have decided to pay the taxes for two years of enterprises that do new hiring, have decided to finance farmers, build new coldhouses, help the Immagine cooperative..." In short, in Fanzini's view: "Today, closing the Caorso plant, as the Greens call for, would be absurd."

On the other hand, a few kilometers from the power plant, Greens members Giuseppe Magistrali and Gianni Salerno have decided to postpone planting the market garden, in which they have located a radiation detector: "The plant must be closed as soon as possible, because it is already unreliable, worn out by its 50 incidents and its 90 Scram, that is, automatic shutdowns caused by the alarm system. Even moreso since this irresponsible government, after locating a firing range alongside the Latina power plant, is now locating a Tornado air base by the Caorso plant."

In Place of Nuclear

The watchword for the environmentalists is an immediate freeze on production of nuclear energy, following the Chernobyl disaster. But would this not really involve the risk of reducing us to use of candles, pending science's ability to make practical the use of new energy fuels?

The reply is given by four experts, four "betes noires" of the ENEL, four agitators who the power agency would very much like to disappear from the face of the earth, after they have for years succeeded in stirring up all the people affected by location of the nuclear power plants and other big coal

plants that are highly polluting. They are the DP [Proletarian Democratic Party] antinuclear deputy, Edo Ronchi; ENEA engineer Paolo Degli Espinosa; and two experts of the Environmental League, Massimo Scalia and Gianni Mattioli, physics teachers at Rome University. They explain: "First of all, the equation put out by ENEL that increase in the GDP must automatically be accompanied by increase in power consumption no longer applies. Italy is a country with zero population growth, and the energy-using industries such as chemicals and steel are giving way to the new technologies of low energy consumption."

Yet, we will have to substitute in some way for the 12,400 megawatts that we would get from the nuclear power plant and from the others planned, along with the big coal power plants. "The truth is that, given our reserves, which are far higher than the European average, we could satisfactorily get by with the present stock of power plants, unless we irresponsibly profit from the drop in oil prices to stimulate waste of energy, as is already being done by demagogic measures such as reduction of rates. In any case, if the 8.1 trillion of planned expenditure for nuclear plants between now and 1987 were directed to energy saving and renewable sources we would be able to greatly strengthen our energy capability."

Many people describe this as a fairytale, a utopia. "Let us explain. None of us are thinking of all at once replacing our power plants, two-thirds of which are less than 15 years old, with solar, geothermal, or wind energy. We are not crazy. It is just that we have enough methane to use in the power plants, even after it is fed into the city gas systems. Furthermore, it is quite realistic to plan that within 10 years 7 percent of our energy will be produced from renewable sources." Here begins the list of the possibilities and potentials: exploit the huge underground pockets of steam, for example in Lazio and Toscana, for geothermal power plants. Construct the first fields of air generators to exploit the wind, with pylons fitted with rotor and propeller. Introduce use of photovoltaic cells, that is, solar energy, in isolated locations where it is expensive and wasteful of energy to extend the central network. And further, to build small, 100-megawatt coal power plants, of low pollution, to avoid the great waste of power in transmission over great distances from the big, polluting power plants.

In short, the antinuclear people on the attack are convinced: "If all this is not being done it is only because the investments have been directed elsewhere, based on the short-sighted and centralistic decision for the mega-installations. We are not dreamers, our proposals are not only more responsible but also more modern than those of the promoters of nuclear at any cost, who play down the concern of the people and treat the millicuries released into the air, water and ground as a simple fact of life."

Control of ENEA

Rome L'ESPRESSO in Italian 18 May 86 pp 6-11

[Article by Enrico Pedemonte: "Who Controls ENEA? ENEA."]

[Text] In Italy there is a technical body (called DISP, Board for Nuclear

Security and Civil Protection) that is concerned with overseeing security of the nuclear power plants: it approves plans, issues the operating licenses of the plants, and checks on proper management. Then there is a body (called ENEA, National Board for Alternative Energy Sources) that is devoted mainly to construction of nuclear installations. No one not already informed on the issue would suppose that the former (the watchman structure) was an integral part of the latter (the constructing body). Yet that is really the case. The DISP, as those familiar with the projects know, is one of the "departments" into which ENEA is divided. It thus finds itself in the embarrassing situation of having to "check" the plants constructed by the body by which it, in turn, is "checked."

Naturally, you would not find anyone to maintain that this situation should be continued. Moreover, the necessity to separate DISP from ENEA has been supported by an almost unanimous majority for at least 10 years. Indeed, in 1981, when the old CNEN (National Committee for Nuclear Energy) was converted into the present ENEA, the budget law of the first 5-year plan (1981-1985) of the body provided in an official manner that "within a year" DISP would be merged into a "Major Risks Board" to which would be assigned all the surveillance of industrial and civilian plants. Needless to say, that call has remained a dead letter.

Then, in December, the issue was raised again during the discussion of the PEN. Also on that occasion, everyone was in agreement, government and opposition: within 6 months, the PEN provided, the government should have established a new "Major Risks Board" that would naturally incorporate the DISP of ENEA. Since then, silence. Only the PCI (in addition to the Greens) has continued to remind of this project: "If by June this commitment is not met," threatened Communist Senator Urbani, secretary of the industry committee of the Senate, "we will block discussion of ENEA financing."

And this was no light threat. The budget law for the second 5-year plan provides for allocating 5.4 trillion to ENEA.

Will the strength of the nuclear cloud be enough to untie this knot? The problems to be overcome are not simple, they have little to do with the matters of principle of nuclear energy and instead a lot to do with the struggle for dividing power among the ministries. The acclaimed "Major Risks Board" would in fact have to combine many responsibilities that are today fragmented among various ministries: the responsibilities for the Seveso directive and the environmental impact of the thermal plants (Health); dams (Public Works); and ENEA and mines (Industry), only to give some examples. Thus, it is easy to understand why the interested ministers engage in passive resistance to avoid losing even a single shred of their own power.

The discussion of ENEA's second 5-year plan will be a tough test bench for Italy's entire energy policy. We will have to see how this 5.4 trillion is divided to determine to what degree it will represent, even symbolically, the enemy to be tackled by the ecological movement. The major slice (1.76 trillion) is for the PEC (Fuel Elements Tests), an experimental reactor planned to study the best blends of fast reactor fuel of the "next generation" Superphoenix: plutonium plants that the environmentalists regard as much more

dangerous than the present plants (of the Caorso or Montalto di Castro type). An additional 630 billion will go to the "Cirene" plant, which is also experimental, planned 20 years ago and under construction since 1978 in Latina. A further 860 billion will be spent for "studies of the fuel cycle"; 450 for nuclear fusion; 520 for alternative sources; 260 for "environmental protection and human health"; 450 for technological innovation; and 320 for "nuclear security surveillance activities."

Remarks on Radioactivity

Rome L'ESPRESSO in Italian 18 May 86 pp 6-11

[Interview of Laura Conti by Gad Lerner; date, place not given]

[Text] Laura Conti, the most well-known thinker on Italian ecology, a member of the PCI but always antinuclear, received continuous and concerned indications during the days of the great radioactivity fear. Now he wants to report on them.

[Question] What was involved?

[Answer] "I will tell about the most serious and symptomatic case. I was informed by a famous rsearch center in Lombardia that a radioactivity concentration 24 times greater than the acceptable maximum had been detected in rain. I was telephoned from a mountain location, still in Lombardia, to find out why they should have detected a concentration 15 times that registered on the plain. This was probably the result of the wind, which sweeps the plain, while in the mountains it can produce vortexes. In short, this explains how impractical is the official data provided by the government and ENEA."

[Question] Can't you be more specific regarding the sources?

[Answer] "Unfortunately, no, it would compromise the people with whom I am in contact. Also, it has happened this way throughout Italy: the technicians of the monitoring centers have often called newspapers or experts to provide them with their data. But always on condition of anonymity, because release of this data is prohibited. In Milan, Bologna, and a few other places the university institutes have chosen to make their findings public. Were it not for them, the people would remain in the dark, because they have been able to learn from ENEA and the government only the averages, much lower, never the individual realities of dangerous concentration, as should have been necessary."

[Question] How do you explain this?

[Answer] "Obviously, the holders of this information have wanted to arrogate to themselves the right to great discretion, which appears very serious to me. Otherwise, they would have said: people, this is the threshold that we regard as dangerous, and beyond which emergency measures should go into effect. And yet all we have had is confirmation that the concepts of "nuclear" and "free information" are in themselves contradictions. And not only in the USSR."

[Question] Why is this?

[Answer] "It originates in the direct relationship between peace nuclear and war nuclear. Do you know that France does not want to put the Super Phenix reactor under EEC surveillance because it uses some products for military purposes?"

[Question] In addition to the holders of the information, you have also criticized the technicians, the experts. Why?

[Answer] "Because they have failed to talk about the risk threshold. The concept of 'risk' has been expressed in 'probability' and 'seriousness.' The probability in Italy may be low, but that does not mean the same is true for the seriousness. Otherwise, the people might conclude that the toxic cloud in Kiev causes cancer while here it produces a rash. However, unfortunately not even my party, the PCI, was able to denounce promptly this very serious misinformation."

9920
CSO: 5100/2553 END

END OF FICHE DATE FILMED

29 AUGUST 198